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Psychological Influences in Buying

Influence Traced of the Man of Mere Money, the Practical Man Who Despises Theory, the Theorist Without Experience

BY JOHN J. RALPH

PSYCHOLOGICAL is a word which has been badly overworked, but it is really necessary to take into account the disturbing effects on a man's mind of various emotions and differing conditions. In buying, particularly, it is necessary to make certain that the man who makes the decision in purchasing shall have an unbiased mentality, so that he may examine the problems that come up, and make decisions, on the basis of the merits of the problem alone.

The human brain, although a most marvelous mechanism, is an exceedingly imperfect one. No man is absolutely logical, nor is he capable of absolutely logical processes, nor can he tell where and when his mental processes are going astray. No man has a perfect grasp of all of the fundamentals of any problem he may be considering. Here, again, he is not conscious of just where there is a wrong or imperfect misconception.

As a result of experience, men learn to distrust their mental processes at certain points, and to take steps to test the accuracy, both of the basis of judgment and the actual judgment itself. Sometimes, in fact, usually, experience has developed into instinct. In a few cases men deliberately study themselves to find where they are liable to err, and take steps to correct these weak spots. These are the men whom, after we know them and their methods, we are willing to trust, because they have found the essence of wisdom, and have remade themselves, so that they are in harmony with its laws.

Of the lesser men, there are those who have discovered that they are not infallible, but have not yet got to the point where they know where they are liable to err, and therefore distrust themselves throughout. These are the hesitating, vacillating type.

Of the confident, competent appearing type there are two kinds which must be recognized, and avoided. The one is the man who has gained his experience in a limited field which, because of the very small extent, he has been able to explore thoroughly, and in which he is therefore at home. Not having experience in larger fields, and in lines which require different types of thought, he has no realization of his limitations, and therefore carries to new fields bull confidence, which lasts until he has had some lessons, which make him, if he is really of big caliber, or break him, if he is rigid or of small caliber.

The past seven years has developed another type. Through some shift of good fortune he has been placed in a position of responsibility, and has been carried along with the general tide of development and increase — a tide so strong that it made little difference whether decisions were right or wrong, because there was margin enough to cover anything, if only there was activity enough. In the next seven years many of these will fall to their proper sphere. Some have already dropped.

ONE difficulty of management is the need to work through others. The man of ultimate responsibility cannot make all decisions. Delegation of authority must be made. This may give autocratic power, or it may use the combined brains of the "best minds" in the company. Under the latter method, advocates of a new move may be put through a severe grilling, bringing out all its features, pro and con. This should enable the group to act with more wisdom than ordinarily rests in one solitary brain.

The difficulty of the management is the necessity of working through others. Even in the smaller concerns, it is not possible for the man of ultimate responsibility, the owner, to make all of the decisions, should he be capable of it. It is necessary to pass on the authority to make decisions, whether or not this is formally done. It is inevitable that the stronger personality will influence the weaker. Absolute knowledge has a habit of making itself felt, even in the most irresponsive quarters.

Usually the delegation is informal, understood. There are concerns which have faced the problem, have understood the limitation of men's minds, the effect of personality, and that facts are absolutely independent of any man's conception of them, except as his mind is in attune with them. Some, fortunate enough to have men of wisdom, proved and tried, have turned the entire problems over to them and have given them autocratic power. Or, it may be that those men have seized this power and hold it by virtue of their strength.

Another solution, safer, and capable of far greater extension, is the basis of the growth and health of some of the finest concerns in the country. This is the use of the combined brains of a number of men. As handled in one very conspicuously successful concern; each question of major importance is gone into by the combined heads of the different departments, together with whoever else is particularly skilled in that particular subject, and irrespective of whether they are connected with the organization or not.

This council is a pure democracy, except for a chair-

man. Each man forgets the position of every other one, and is either for or against any proposition that may come up, and fights for it to the best of his ability. In order that there may be no "crowd thinking," some one or two men take the negative position, and oppose the proposition with every resource. Because of the excellent personal relations in this group, it is possible to use tactics that would not be permitted in a debate, and the opposer will often offer specious arguments, not for the purpose of misleading, but to change the angle of thought and make sure that the entire subject has been thoroughly and absolutely covered.

Years of practice in this have developed fiendish skill, and the grilling the advocate of a new plan is put through could not be bettered in the Supreme Court. All through, there is the saving realization that absolutely no politics are being played, and that the entire discussion is to arrive at a conclusion which will be for the best interests of the company.

For every proposition there is also internal support, it being realized that it is just as possible for all to be wrong, when in opposition, as it is for all to be wrong when approving a proposition before such drastic investigation. The entire organization being keyed to action, the session is not a mere debating society. Seldom is a proposition put through just as proposed. It is very seldom that one, which has finally been approved, does not go through successfully and to the great profit of the company.

The entire personnel has been assembled with the basic idea in mind that each individual has special characteristics, both of weakness and strength, of knowledge and of ignorance. In more than one instance an entire business has been bought, not because of the customers, or the product, but because there is in that concern some man or men who have abilities needed in the buyer's organization.

As an organization, they are not without knowledge of the necessity of recognizing the "master man," he who, because of his mentality, his experience, his vision, is capable of working alone, and because of his personality is incapable of working with others except as an autocrat. More than once such a man has been given carte blanche within the limits of his specialty—again to the great profit of the company.

Whatever the type of working adopted, it is necessary to delegate authority, and this is the greatest problem of management — the choice of methods of action and of men to assume responsibility and authority.

Starting vs. Running Conditions

With the increase of available capital, and the larger minimum size of enterprise in many lines of to-day, the difficulties of starting are far greater than those of years ago. This has brought to the front the difficulties of initiating an enterprise as against the difficulties of running one. It is easy to see that, where the plant is running, practically all of the problems that will arise have already been felt to a certain extent, and even though it be expanded many times, still there are few new ones.

On the other hand, where an enterprise is created from the ground up this is not the case, even if men are selected who have been engaged in that kind of work. The type of man who can envisage the future, can see machinery running, master the difficulties which will arise, make provision for possible mistakes of judgment, and above all eliminate the bugbear of every man who plans—the point that was overlooked or forgotten—is considerably different from the man who can see the troubles in a plant that is operating and take steps to remedy them.

There is the inevitable confusion due to an organization which has not worked together, twice confounded because discussion and plans involve concrete eventualities not yet existing. The mutual interdependence necessary, combined with the mutual distrust due to discovery of faults of mentality, of knowledge, of oversight, and the driving necessity for action lead to arbitrary decisions based on insufficient investigation.

During the past seven years there has been example after example of this in every part of the country. Visitors from Europe and returned travelers from there tell the same stories of similar difficulties.

In 1915 there was in this country implicit confidence in American genius, in its ability to conquer any problem, provided the purse was moderately long. Financiers felt that ability of any kind could be bought in the market, at small prices, and that they had the genius of management and executive ability. Plant after plant was started, guarantees of performance were freely given, before a line was drawn on a single plan, in some cases even before the location of the plant had been decided upon.

Reaction Based on Experience

By 1917 the manufacturing world had begun to realize that matters were not so simple as that, for, of all the plants making war munitions, few had succeeded save those which marely amplified their capacity for stock goods. It was no longer possible to obtain money for a plant by merely showing a contract to make goods at a high price, for there had been too many failures.

But this lesson had not been transmitted to the country, and on our entry into war there was immediately an outbreak of plans which were guaranteed to work wonders in production in a few weeks or months. At the time of the armistice there was scarcely a plant which had taken on new work, or which had embarked on a new enterprise, which was actually delivering in accordance with estimates. This holds for guns, for recuperators, for airplanes, for ships, for war instruments, for shells, for chemicals and for all production that was not essentially simple.

Just as the racing experience points out faults which must be corrected in the touring car, so in the past time of stress weaknesses stood out in bold relief, which are present in ordinary times, but which are not always recognized.

As purchasing is the culmination of planning and decisions the control point is here. The actual lacks are of course back of that—in the organization, but at this point they should be rounded up and checked back to make certain that all is right.

There has been a tacit understanding that as we "won the war" everything was all right. Few have cared to confess their individual troubles. Washing dirty shirts in public is often a pleasurable exercise, but not when that shirt is your own, and when you have other shirts, and there is a possibility that they may be—well, slightly soiled.

Some Lessons of the War

First and foremost is this—the man who has accumulated or learned to control money is not necessarily an executive thereby, nor is he endowed with supernatural wisdom.

The number of men in this country who really know how an organization should function, and the reasons for the various parts, is few; most of them are working and are not available.

It is necessary to know not merely how an organization must function in general, but to forecast the type of organization that will be necessary to handle the particular problem.

It is absolutely necessary that there be someone in control, or in a consulting capacity, who has a full knowledge of the difficulties to be encountered, the technical resources necessary for each part of the organization, the points at which the various departments

will touch, the orderly arrangement of all to insure against omissions and duplication of effort.

There are few men able to prejudge another man's knowledge and abilities. It requires the test of actual association and actual proving of his work for almost all men to be able accurately to evaluate another man or his work.

Men trained in Government activities, as at present conducted, are absolutely useless in private employ, as directors having absolutely no knowledge of a dollar, and the necessity or organization to return dividends and avoid waste.

Because a man is a "practical" man in operation, there is no assurance that he has the ability to plan, even though he may have been eminently successful in his line.

Whenever a new project is gone into, every man has some pet philosophy which he is absolutely certain will work. It is necessary to test carefully all such theories, even if they emanate from "practical" men. This test must be conducted with the utmost of care and laboratory rigidity, for it is possible to make such tests only in small size, while in actual operation there will be difficulties which will not show up in the laboratory test.

The work of every man should be reviewed by others, equally competent if possible, and everyone in the organization should be alert to catch troubles, whether due to omission or commission.

The technical work and quality of performance should be far higher than is demanded in running plants, and provision should be made for quickly and ruthlessly making changes to correct for past errors.

The cheapest place to correct an error is at the drafting table—not in the shop. A plan of operations still in the formative stage can be changed by dictation to a stenographer, but after contracts have been entered into the slightest deviation will cost much money.

The autocratic or line control, that in which the man highest up exercises final control of all decisions, is absolutely impractical, because the number of decisions to be made is so great that no human can make them all in the time available—even if he is competent to do so.

Delegation of Responsibility

The work should be carefully divided into units, and these units put in the control of competent men who work only within this field. All work done in each of these units should be carefully checked. It should be understood that absolute practicability of operation is desired, and that nothing that is not recognized as good practice is to be initiated. After the plant is running is the time for making experiments to cut down costs. In starting, safety and absolute certainty of operation are imperative.

To plan and get a plant in running order takes many times the number of executives, and highly skilled technical men, required after it is operating. During this time the executive is more necessary than at any other time, for he must co-ordinate all activities. This is exceedingly difficult, except where the executive either has a superior knowledge of the problem, so that he is able to delineate the limits of each man's work so that all will dove-tail together, or unless he has that type of genius, in handling men, which enables him to get such co-operation that this is provided for automatically by the welding of the entire organization into one whole.

Every proposition put up to the purchasing department should be as carefully and thoroughly compiled as the report of a consulting engineer. The province of the purchasing department is to buy. It is no part of its function to do engineering work, or to make decisions as between two different materials or machines.

Absolutely all buying should be done through the purchasing department. No other person or persons should have the privilege of giving an order, either verbal or written. The purchasing department should never honor any requisition until it comes to it in the prescribed form, indicating that it has passed through the scrutiny of the proper parties and is, in fact, a well thought out, fully checked proposition.

No drawing should be honored until it carries every signature it is supposed to carry. The elimination of checking is not a cutting down of delay, but is a guaranty of months of delay, doubly costly because not merely drawings but materials, machines, jigs and fixtures will be involved.

Where quantity production is in prospect, it is absolutely necessary that one machine of each kind, with its jigs and fixtures, shall be put through at the earliest possible moment, so that the factory can be operated in miniature and all mistakes eliminated at the earliest possible moment, so that it will not be necessary afterward to correct these mistakes on all of the machinery.

Assuming that the planning organization is working as it should, every week that can by any possibility be spared to it for the preliminary work, for checking and for reviewing, will save weeks in getting under way.

In the planning period the necessity of adhering to system, and the maintenance of discipline, are far greater than at any other stage of the enterprise. After there is the momentum of movement this can be somewhat relaxed, but not in the initial stages. This is absolutely in contradiction of the view of the "practical" man, who has a contempt, often stated but sometimes repressed, for system and resents supervision, unless it be of his own devising. He feels that without a free hand he cannot achieve results, and that with it there is not the slightest doubt of his success.

Baleful Influence of the Theorist

The third member of this triangle is the untried theorist, using this word in its popular, derogatory sense. Accustomed to solving problems in the laboratory or in the engineering class room, and never having known the test of actual working out, and with a supreme confidence in the dominion of mind over matter, particularly his brain, he has brought to the problems a self-confidence that is awe-inspiring.

Any one of the three—the man with money and a contempt for the mere mechanics of plant design and operation, as against the genius able to handle the impalpabilities of the mercantile and financial world; the practical operating man, with a contempt for theory, and lack of experience in the technicalities of planning as against those of operation; the theorist, without the wholesome sense of doubt in his own infallibility generated by experience in having his plans take actual shape—is sufficient to wreck any enterprise.

When all three points of this triangle were perfect, and they were in not a few cases, the proposition was well nigh hopeless. The theorist, chosen because of his pre-eminence among men of theory, was given full sway in general direction. Do we need to do more than to recall the coal mix-up, the present railroad tangle, the wooden ship, to realize the necessity of trial and experience to mature the finest brain?

The Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, has secured oil rights to property at Angola, Portuguese West Africa, totaling about 70,000 square miles, in the name of its affiliated company, Companhia do Petroleo de Angola, and plans for the development of the site. A complete oil plant will be constructed, including power house, pumping plant, pipeline, etc., with proposed erection of a refinery at a later date.

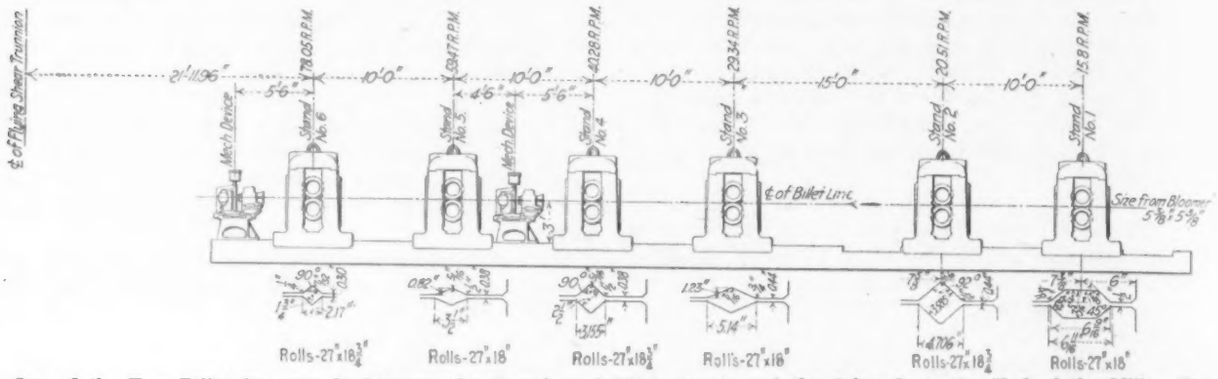
An Automatic Hot Billet Scraper

Mechanical Device for Removing Defects in Use in a Canadian Rolling Mill—Advantages and Savings

BY R. C. ROHRABACHER*

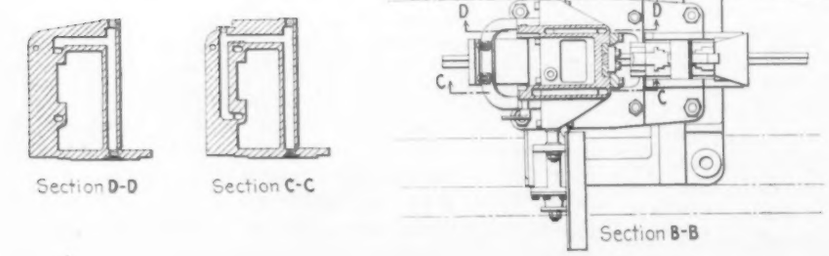
IT would be premature to predict the ultimate value of any billet scraping mechanism designed to supplant the air hammer and chisel in the rolling mill, but new developments conceived with this object cannot fail to interest practical steel men. It is interesting to observe, therefore, that those who are most familiar with the operation firmly believe that automatic hot billet scraping is destined to increase production, reduce losses and improve the quality of the shippable finished product.

*Union Carbide and Carbon Co., New York.

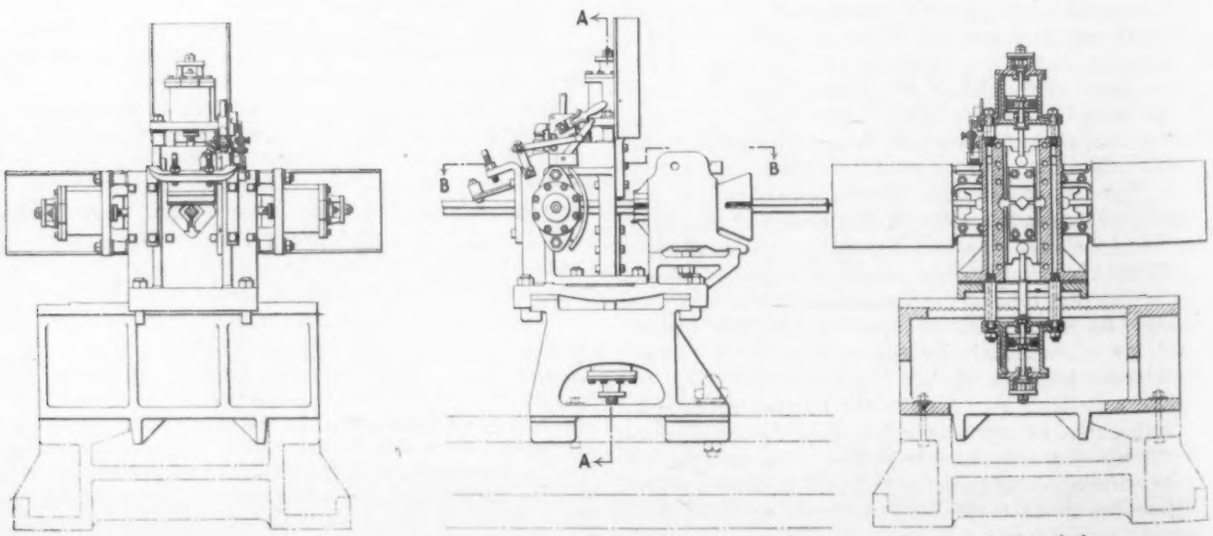


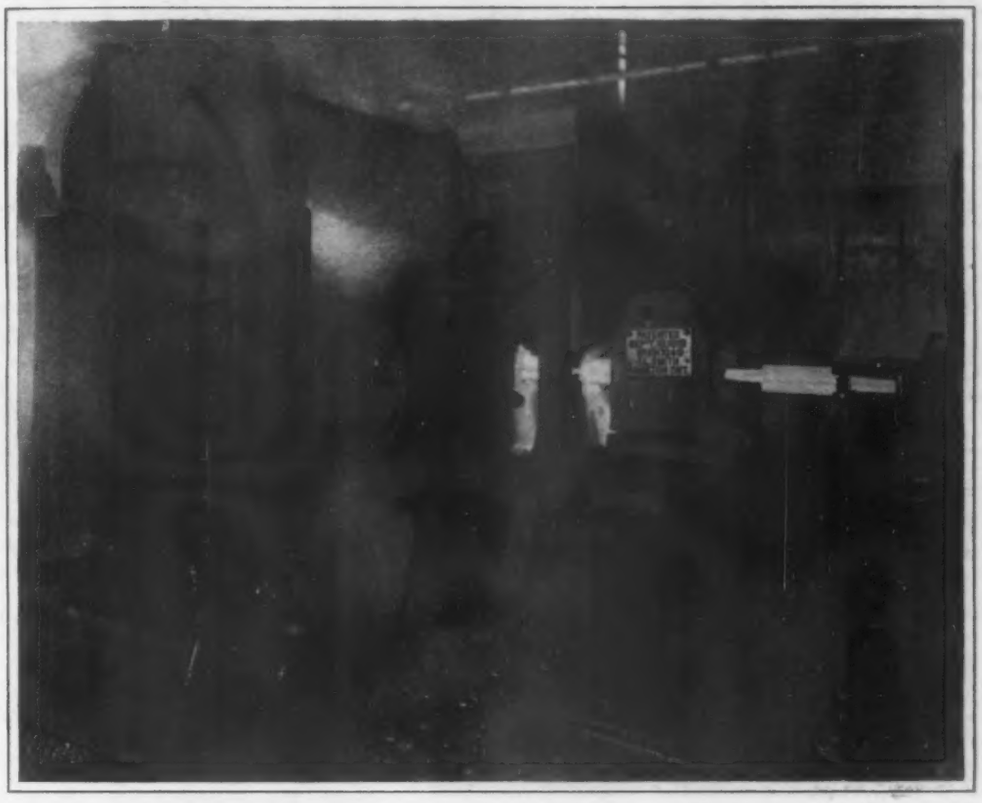
One of the Two Billet Scrapers Is Between the Fourth and Fifth Stands and the Other Is at the End of the Mills. The drawing incidentally gives size and speed of the rolls, the grooving of the rolls (and thus the draft) and the spacing of the stands

Using a bloom as large as 5⅜ in. square, this mill reduces it in six passes to a 1¾-in. billet. The reduction in the first pass is about 37 per cent; in the next four passes, about 30 per cent each; in the finishing pass, about 27 per cent. Elongation of the bar in the first pass is about 59 per cent; in the next four passes, about 43 per cent each; in the finishing pass, about 37 per cent. The theoretical volume of steel per minute leaving the different passes decreases progressively from about 9 cu. ft. from the first pass to about 8 cu. ft. from the finishing pass.



Details of the Smith Billet Scraper Showing Its Construction and the Position of the Stellite Knives





The Billet Scraper Between the Fourth and Fifth Stands in a Canadian Rolling Mill. The quantity of metal being removed is evident as compared with the amount at the second scraper shown in the picture below

Every rolling mill man knows that, unless some means is employed to remove surface flaws, such as slivers, splinters, etc., before the billets pass to the finishing mill, some defects become permanently embedded in the hot metal and often result in the rejection of the finished material. The method now generally employed for removing surface defects involves the use of air hammers and chisels. The need for a cheaper and better method has been felt for many years, but little or no progress was made toward a practical solution of the problem until the superintendent of a Canadian steel mill designed the scraping device shown in the accompanying illustrations.

The rolling process is the same as when no automatic device is used, excepting that there is a scraping mechanism set up between two of the stands of rolls in the series, and another precisely like the first installed immediately following the last stand of rolls, so the billets leave the second scraper machine ready to be finished into the plant product, whatever it is.

The mechanism comprises sets of scrapers designed to engage the surfaces of the passing billets at whatever pressure may be required to remove the flaws, means being provided also for automatically guiding the billets to the scrapers. Pressure is applied independently to each scraper blade, each machine having four cylinders, two of which operate horizontally and two vertically. The apparatus may be operated under air, steam or water pressure, and is so designed that the pressure on each blade is subject to separate control. The automatic operation of the scrapers is provided by means of a bar, so connected and positioned that the passage of the billet trips it, thereby actuating a valve, which controls the operation of the cylinders.

The Billet Scraper at the End of the Stands, Where the Finishing Touches Are Given and Last Defects Removed from the Steel

Thus on entering the scraping device the billet automatically sets the blades against the steel at a pre-adjusted pressure, and on leaving, releases the trip lever which automatically retracts the scrapers.

Having designed satisfactory mechanical equipment, the next problem was to find a material that would have the red hardness necessary to remove the surface defects from the billets while they were being rolled. Obviously steel knives for this purpose would be affected by the heat in almost the same manner as the billets themselves, or at least they would lose their temper, soften and tend to add to the surface defects rather than to remove them.

An Idea of the Character and Quantity of the Material Removed by the Billet Scraper Is Here Shown

After considerable experimenting it was found that stellite possesses the required properties. This is a patented alloy of cobalt, chromium and tungsten created by the American engineer and metallurgist, Elwood Haynes. Due to its high degree of red hardness, stellite is outstanding in its capability to retain a cutting edge at high speed, a property inherent in stellite as cast and not destroyed by temperatures that ruin many cutting steels.

The inventor of the hot billet scraping machine was familiar with the use of stellite for cutting metals and had observed that it held its cutting edge at very high speeds, even when the blades were red hot. In fact, it was shown that at speeds and temperatures where high-speed steel began to lose its temper, the stellite blades actually improved in resistance to abrasion.

It was a knowledge of these facts that prompted the installation of stellite blades in hot billet scrapers, and experience has proved that, in addition to having the essential red hardness for this work stellite resists abrasion better than any of the heat treated alloys.

To rolling mill men who are interested in the problem of attaining a maximum percentage of perfect product from their plants, the data in the tables may have some value and interest. They cover operations in a Canadian plant where the first hot billet scrapers were installed.

Table of Record of Continuous Rod Mill on No. 5 Rods and Larger Sizes

In January, 1919, a patented mechanical device was installed in the 18-in. continuous billet mill to remove flaws from the billets while being rolled. Previous to this installation the production of the mills was seriously interfered with on account of flaws on the billets. The following comparison for 1918, 1919, 1920 and 1921 shows the value of this mechanical device, and the saving that has been obtained since its installation:

Year	Actual Output, Net Tons	Average Per Month, Tons	Average Per Turn, Tons	Aver. Practice Per Turn (Good Product), Per Cent	Increase Over 1918: Practice, Per Cent	Increase Over 1918: Equivalent Tonnage
1918	98,753	8,229.4	198.0	95.4	...	.....
1919	109,866	9,155.5	216.4	96.8	1.4	1,538
1920	117,137	9,761.4	242.5	97.1	1.7	1,991
1921	52,277	4,356.5	232.4	97.3	1.9	993

Increase of Rod Production, Based on 1918 Operations (498 Turns) with Mechanical Device for Removing Flaws Installed

Year	Production, Tons	Increase Over 1918: Average Per Month, Tons	Increase Over 1918: Average Per Turn, Tons	Increase in Practice, Per Cent
1919	9,163	763.6	18.4	1.4
1920	22,161	1,846.8	44.5	1.7
1921	17,629	1,469.1	35.4	1.9

Cost of Knives for Removing Flaws

Year	Total Billets Produced, Tons	Cost of Knives	Cost Per Ton of Billets
1919	180,945	$638	$0.0035
1920	191,367	900	0.0047
1921	109,328	334	0.0030

Pittsburgh Base Hearing

CHICAGO, April 22.—Sessions of the hearing on the Pittsburgh basing point practice now in progress before the Federal Trade Commission in Chicago were not resumed this week until Thursday owing to the illness of C. A. Severance, counsel for the United States Steel Corporation. Among the witnesses who were heard this week were R. R. Robertson, president Robertson Brothers Mfg. Co., manufacturer of sheet metal products, Chicago, and R. E. Spangler, manager Chicago Automatic Machine Co., Chicago, maker of screw machine products, largely used in the automotive industry. Mr. Robertson stated that his company consumed an average of 6000 tons of sheets a year and sells eighty per cent of its output to jobbers. He stated that "Pittsburgh plus" gave eastern competitors an advantage everywhere except in Chicago, Denver and St. Paul and Minneapolis. Ten years ago, when the amount figured on Pittsburgh plus was small, his company did a considerable business in Indiana and Ohio, but now it is barred from these markets, he asserted. Eastern competitors can enter Chicago at only a slight disadvantage, he said, and throughout Indiana and even in such Western points as Clinton, Iowa, and Milwaukee, enjoyed an advantage over the Robertson company by virtue of the operation of Pittsburgh plus.

Mr. Spangler's testimony was of a similar character. A Cleveland competitor, he asserted, could deliver his products in Detroit for $9.40 per ton less in steel costs than the Chicago company. In Chicago the latter has an advantage of $1.50 per ton, but in Cleveland is at a disadvantage of $17.50.

Directors of the Brier Hill Steel Co., Youngstown, Ohio have authorized construction of a general office building, to be located on West Federal Street, opposite the open-hearth department of its Brier Hill plant. It is planned to begin work about May 1. The structure will be five stories and basement, fireproof, with frontage of 162 ft. and extending back 60 ft. Frame will be of structural steel, requiring in excess of 400 tons. A foot bridge will connect the building with the mill. Its estimated cost, including equipment, is $350,000. Architect Richard A. Zenk, of Youngstown, prepared the plans.

The American Skein & Foundry Co., Racine, Wis., manufacturer of farm implement, wagon and general vehicle castings, has increased its working schedule from three days to four days a week, with prospects for a further extension on May 1, due to the improvement in the demand for its products.

Vital Problems Viewed by Metal Trades

National Association at Its Twenty-fourth Annual Convention Listens to Addresses by Prominent Men—Plan of Apprenticeship Training Presented

SUCH important subjects of current interest as the coal mining situation, the economic and political situation in Europe, the progress that has been made in settling labor disputes in so-called industrial courts, the agricultural bloc in Congress, the relations of the railroads with their patrons, present wage rates in industry and the progress of aeronautics since the war, all discussed by men in a position to speak authoritatively on these varied topics, lent great interest to the program of the annual convention of the National Metal Trades Association at the Hotel Astor, New York, on Wednesday and Thursday, April 19 and 20.

Among the prominent speakers were E. L. Greever, counsel for the open shop mine owners of West Virginia; Harold G. Moulton, associate professor of political economy in the University of Chicago and former editor of the Journal of Political Economy; James A. Emery, counsel of the National Association of Manufacturers; A. M. Loomis of the Washington office of the National Grange, a farmers' organization; L. F. Loree, president Delaware & Hudson Railroad; Magnus W. Alexander, managing director of the National Industrial Conference Board; Howard E. Coffin, vice-president of the Hudson Motor Car Co., Detroit, who was a member of the Council of National Defense representing aircraft during the war; former United States Senator Charles Thomas of Colorado and Dr. William H. P. Faunce, president of Brown University, Providence, R. I. The three last mentioned were speakers at the annual banquet which took place Wednesday evening.

W. W. Coleman, Bucyrus Co., South Milwaukee, Wis., was reelected president; J. B. Doan, American Tools Works Co., Cincinnati, was elected first vice-president; Paul C. DeWolfe, Brown & Sharpe Mfg. Co., Providence, R. I., second vice-president; John W. O'Leary, Arthur J. O'Leary & Son Co., Chicago; treasurer.

Councilors were elected as follows:

COUNCILORS FOR TWO YEARS

Albert J. Ford, Fuchs & Lang Mfg. Co., New York.
E. J. Miller, St. Louis Screw Co., St. Louis.
A. J. Gifford, Leland-Gifford Co., Worcester, Mass.
J. D. Cox, Jr., Cleveland Twist Drill Co., Cleveland.
W. R. Angell, Continental Motors Corporation, Detroit.
Joseph F. Cooley, Hartford Machine Screw Co., Hartford, Conn.

COUNCILOR TO FILL UNEXPIRED TERM OF PAUL C. DEWOLFE

Harold C. Smith, Illinois Tool Works, Chicago.

COUNCILOR TO FILL UNEXPIRED TERM OF F. W. MIXTER

Harold Edwards, O. M. Edwards Co., Inc., Syracuse, N. Y.

HONORARY

Justus H. Schwacke, William Sellers & Co., Inc., Philadelphia.

Tribute to Mr. Caldwell

A resolution was adopted by the association, expressing appreciation of "the long and faithful service to the association" of F. C. Caldwell, who has resigned from membership. Mr. Caldwell was president in 1912 and treasurer from 1913 until recently. The association extended to Mr. Caldwell its best wishes for his future happiness and success.

President Coleman Discusses Labor Problem

W. W. Coleman in his presidential address said that he was inclined to believe that with the current revival in business and the further readjustments in wages the coming year would not be so free from labor disturbances as the past year.

"The question of hours of work is a most important one," said Mr. Coleman, "and should be given much serious thought. During the war and the period of inflation following it, hours of work were very generally reduced. These changes were brought about for various reasons, but they cannot continue if we are to produce upon an economic basis and to maintain our position as one of the leading industrial nations of the world. In establishing hours of work, we should realize the necessity for every worker to have an adequate period of leisure for rest, recreation and home life; but aside from this the hours of work should rest upon the economic necessities of individual establishment or industry. The facts gathered and distributed by the National Industrial Conference Board show conclusively that in some branches of industry hours may be reduced without curtailment of production, but that in other lines the same reduction of hours results in a proportional decrease in production. In reaching our conclusions, we should utilize all these available facts and not be influenced by the desire to obtain undue profits. It is also desirable and important that the workers should fully understand the economic reasons for the establishment of these hours.

Important Decisions

"There have been a number of decisions by the courts during the year which have done much to make clear the question of the right of the individual to work when and where he desires and these decisions indicate, in only a few localities, however, a firm determination on the part of the courts to enforce the law, to preserve order and to establish the fact that under our laws there is no privileged class.

"Two decisions were handed down by the Massachusetts courts—one held that 'the right to work necessarily includes the right to work wheresoever or for whomsoever the individual sees fit.' The other referred to the intimidation tactics undertaken by the strikers at the Moore Drop Forging Co., Springfield, Mass., where the individual contract system had been adopted. The court said: 'Law and order in this community must be maintained. It appears that the men are on strike at this company, but their acts must not extend to intimidation; all men who have the right to work and other men cannot deprive them of it; violence will not be tolerated under any circumstances.'

"The United States Supreme Court in its decision in the case of the Duplex Printing Co. vs. Deering, construed the Clayton Act as not legalizing the secondary boycott. It was after this decision that Mr. Gompers declared in effect that decrees against labor unions would be disobeyed and denounced our judicial system, accompanying his declaration with a demand that 'government by injunction' be killed.

"Four opinions were handed down by the Appellate Court in the first district of Illinois holding that there is no such thing as peaceful picketing.

"The United States Supreme Court issued its decision in the case of the American Steel Foundries vs. Tri-City Trades Council. There were two important points in this decision—first, that picketing as commonly practiced in labor disputes is illegal; second, that so long as organized labor remains within the law, it has the right to undertake the organization of unorganized plants even if it has no members in the plant.

"Another important decision was that in the case of Truax vs. Corrigan and the Cooks and Waiters'-Union. In

construing a law passed by the legislature of the State of Arizona prohibiting courts from enjoining picketing, the United States supreme court held that picketing becomes unlawful when it injures business and that it can be enjoined, the statute notwithstanding.

Importance of the Judiciary

"The fact that we in this country have a written federal constitution and that each State in the Union has also a written constitution makes it essential that our judiciary should consist of men of the highest character and education. The custom in most of our States of electing judges for terms of varying lengths and of paying them inadequate salaries results usually in the election of men who are not competent to hold such positions. In my opinion, one of the greatest advances which our form of democracy could make would be a better method of selecting judges whereby only competent men would be chosen—men well versed in the law, and able to interpret the constitution and to administer justice efficiently and promptly and to whom an adequate remuneration should be paid. In this way only can we hope to obtain, throughout the country generally, a proper respect for law and order which is sadly lacking in our social organization to-day.

"The excesses and abuses brought about by the closed shop policy of the unions in various centers of the United States have been sternly rebuked, and some cities which have been long under the dominance of organized labor have in a measure thrown off the yoke and brought about a new relationship in industry which can only result in a greater degree of industrial peace and a consequent larger measure of prosperity to the community."

Commissioner Sayre Tells of Adjustment of Wages

Homer D. Sayre, former secretary of the association, who recently succeeded J. D. Hibbard as commissioner, submitted his first report, which in part was as follows:

"The past year will be remembered by most of us as one filled with unusual problems and events. Our industries—and particularly the metal trades—have gone through a siege of depression which has called for unusual leadership. Unemployment, which began early in 1921, soon attracted nationwide attention, and grew to such proportions as to be given official cognizance by President Harding last fall, when a group of selected men met in Washington at his request, to devise ways and means for its relief. The peak of unemployment, according to official Government reports, was reached in July, and about this time the opinion was also generally voiced that our industries had passed through the worst.

"Notwithstanding the demoralized condition of our industries, the aggressions of labor unions, particularly where they had a firm hold, continued with reckless abandon. For the most part, the strikes which occurred were of the 'knock-down-drag-out' type, the most recent of which, the coal strike, is with us today.

"Naturally these labor controversies could only aggravate the unemployment situation. It is a curious circumstance that while organized labor, through its chosen representatives, was participating in the deliberations of President Harding's unemployment committee, we find a nationwide printers' strike in effect to enforce demands for increased pay and less work, to say nothing of countless local walkouts and jurisdictional disputes, which brought about the unemployment of thousands of men and women willing to work. The net result of organized labor's activities during the year 1921, according to Government figures, was a loss to our industries estimated at four billion dollars. Assuming the correctness of this figure—and I have not seen it contradicted—we find that the activities of labor agitators have succeeded in placing a burden of about $39 upon every man, woman and child, comprising our population of 105,000,000 people, or at the rate of $3.25 per month which you and I and everyone else in this country must pay for labor unionism; a new kind of tribute, in addition to the taxes which must be paid to Government, State and municipality.

"During this entire time, in spite of disturbed conditions in many sections of the country, there have been no strikes in the plants of any of our members—which means that our member companies have contributed not one item to this appalling waste. How many industries can report a similar record for the year?

"Necessary revisions of wage and working schedules have been made by many members, and in every instance, so far as we know, the adjustment came without disturbance in the harmonious relations existing theretofore; in many cases, the workers having previously concurred therein, looked upon such a step as an economic necessity to keep the wheels of industry turning. This is in sharp contrast to the policy uniformly advocated by labor leaders ever since the signing of the armistice, to resist to the utmost any attempts to bring wages back to a normal level. Here, in my opinion, is unanswerable evidence that the wage earner exercises sound and sane judgment when outside influences do not enter into the negotiations between employer and employee. Given an opportunity to earn wages commensurate with skill and productivity, a safe and healthful place in which to work, and accorded fair treatment, he realizes that nothing further is to be gained through membership in a labor union.

"Such a policy of dealing with the worker typifies the open shop principle as advocated by your association, which, reinforced by the power to adequately defend it against attack, affords our members a combination which by guaranteeing the worker a square deal, promotes contentment, assures efficiency, reduces the strike hazard to a minimum and hence furnishes the greatest degree of industrial security.

Annual Survey of Business and Labor Conditions

"In order to prepare a survey of conditions in the shops of the members, a questionnaire was sent out asking for certain specific information. The replies have been tabulated in composite form by districts and industries. Assuming that the reports given are fairly representative of the membership as a whole, it is plausible to conclude that conditions as they now exist show an improvement over a year ago. The basic questions of this report are numbers three and four, which have to do with the average man hours and the number of workers in a plant. These questions deal with conditions as they exist to-day. Comparing average man hours in January, 1922, with the same month in 1921, we find that 326 out of 539 firms are operating on a basis of 60 per cent or better. A comparison of January, 1922, with the same month in 1914 shows that out of 430 reporting, 53.7 per cent are doing better than 60 per cent of the 1914 basis.

"A comparison of the number of workers employed during January, 1922, as compared with the same month in 1921 reveals practically the same ratio, namely that 365 members are employing 60 per cent or more of the number on their payrolls a year ago last January. For the comparison with the year 1914, only 439 submitted figures. These show that 301 were operating 60 per cent or better during the month of January, 1922, as compared with the same month in 1914.

"An analysis of question five shows that the average rate paid in 1922 was 50¾c. per hr.; in 1921 58 2/3c. per hr. and in 1914 30¼c. per hr. This shows that wages are 13.8 per cent lower in 1922 than they were in 1921, but still 67.7 per cent above the 1914 rate. The wages received by the men in themselves mean nothing, but when compared with the cost of living they assume a definite meaning. The cost of living, according to the National Industrial Conference Board, based on 1914 as normal, was in 1922, 18.6 per cent below 1921, but still 57.7 per cent above 1914. This comparison of wages and cost of living shows that wages in our membership in 1922 are still 10 per cent above the cost of living when considered on the 1914 basis."

In his first annual report the new secretary of the association, L. W. Fischer, covered in detail such points as membership, hours and wages, apprenticeship training, the safety department and other routine features of the association's activities. He said that the secretary's office had been requested in numerous instances to furnish information for public debates on the closed versus the open shop.

The Industrial Emancipation of San Francisco

Following the presentation of the reports of association officials, there was an interesting address by Robert N. Lynch, vice-president and manager of the San Francisco Chamber of Commerce on "The Industrial Emancipation of San Francisco." That city, which was once the stronghold of labor unionism in the United States, particularly in the building trades, is now largely open shop. This change was brought about, Mr. Lynch said, through an aroused public sentiment, plus the campaign of the Chamber of Commerce to restore the principle of equal opportunities to all labor on the so-called American plan. The strength of the union movement in San Francisco was due largely, the speaker said, to the widespread opposition to Oriental labor. For a time, union labor had public sentiment strongly in its favor and the result was the tightest closed-shop city in the country. P. H. McCarty, the building trades labor leader, was elected mayor of the city, whereupon labor tightened its grip not only upon the labor situation but upon politics. The situation reached such an extreme that labor leaders set up a "court" of their own to which employers were haled for any infractions of the labor union rules. It was impossible to bring in building materials or other raw products unless they bore the union label stamp. Police judges were sympathetic with all strikers and even the police department winked at law violations when committed by union labor. Picketing became a science until eventually there was an organization of professional pickets, demanding more pay, which the other unions refused. Then there were non-union pickets and the union pickets picketed the non-union pickets. Another extreme example of the lengths to which the labor unionists went was cited by the speaker as having occurred during a stevedores' strike in 1916. The movement of ships in the harbor was so effectively tied up that even the United States Government had to obtain a permit from the union to unload a ship on which there was a cargo of specie.

San Francisco eventually woke up to the seriousness of the situation, Mr. Lynch said, and steps were taken by the San Francisco Chamber of Commerce to arouse public sentiment against what had become class oppression. The chamber raised a fund of $1,300,000 by popular subscription and set about to compel a respect on the part of the unions for contractural relations, law and order and the open shop. An industrial committee composed of the heads of the largest industries in San Francisco was formed and the Chamber of Commerce, through this committee, took the situation rigidly in hand. An ordinance was passed by the city council prohibiting picketing; the chamber conducted an advertising campaign to educate the public and the workingmen, themselves, to their plan of campaign.

The transition from closed to open shop is illustrated by what Mr. Lynch said happened in the metal trades. A strike of 47,000 men was called on Oct. 1. By Thanksgiving 5000 men were back at work and by the following February 30,000 had returned to work in open shops. At the present time more than 80 per cent of the metalworking shops in San Francisco are operated as open, no discrimination being shown as between union or non-union men.

Mr. Lynch said that every effort is being made to prevent injustice to the workmen under the new system and that wage rates are higher in San Francisco than in neighboring cities. He predicted that San Francisco would never return to the closed shop basis.

John W. O'Leary of the Arthur J. Leary & Son Co., Chicago, who is Chairman of the citizen's committee of Chicago appointed to enforce the Landis award in the building trades, told of the work which that committee has accomplished to restore normal conditions in that city. Mr. O'Leary said that the slogan of the committee is, "Work must proceed in Chicago," and that so far its work has been successful in partially restoring normal conditions.

Economic Conditions in Europe

Harold G. Moulton, assistant professor of political economy at the University of Chicago and former editor of the *Journal of Political Economy*, coauthor of "America and the Balance Sheet of Europe," who has recently traveled extensively in Europe during which time he made a careful economic survey of the present situation, delivered an important address on the European situation, in which he covered such questions as restoration of the gold standards, balancing of budgets, the international debt, foreign trade and the other vital matters which are bound up with one another in our present world relationships. His paper will be published next week.

The Farmer as a Balance Wheel

Discussing the present position of the farmers in politics, the agricultural bloc in Congress and other matters in which the agricultural side of industry is interested, A. M. Loomis of the Washington office of the National Grange, a farmers' organization, endeavored to present a picture of the farmers' attitude toward current problems. Mr. Loomis pictured the farmer as a balance wheel as he is both a capitalist and a laborer.

The Industrial Courts

James A. Emery, counsel of the National Association of Manufacturers discussed the legal and practical phases of the so-called industrial courts, such as the one established in Kansas, and the step taken in the same direction by the formation of the Railway Labor Board by act of Congress. He traced the proceedings of the Kansas court through the coal miners' strike, but the only conclusion he drew from the experiments which have been conducted along this line is that it is too early to apply the principle of official adjudication of disputes between employers and employees. He said that amendments to the constitutions of several States have been adopted empowering the legislatures to pass bills establishing State industrial courts but that there has been no general disposition to follow the example of Kansas. He said that the weakness of the industrial court is that it has no power to enforce its awards.

The Deflation of Wages

Tracing the decline in wage rates during the past year, Magnus W. Alexander, managing director of the National Industrial Conference Board, pointed out that wage deflation on the railroads and in the coal mines has not kept pace with that in the manufacturing industries. He pointed out that studies by the research staff of the National Industrial Conference Board show that the average actual hourly earnings of wage earners in manufacturing industries, at the peak of 1920 were 156 per cent above those prevailing in July, 1914, On July 1, 1921 they had dropped 15.5 per cent but were still 114 per cent above 1914. Estimating the average reduction in hourly earnings for the last six months of 1921 at 10 per cent, the average actual hourly earnings in manufacturing industries on Jan. 1, 1922, are shown to be 92 per cent above 1914.

"But," said Mr. Alexander, "it is not what the wage earner receives in dollars and cents that is our chief concern. It is what his wages will buy when the wage earner goes to market that ought to interest us. A man may have received $10 per week in 1914 and been able to buy for himself a certain adequate standard of living which also cost $10 per week. He would be no better off, in an economic sense, however, if he were now receiving $20 per week, or double his 1914 wage, and if the

cost of the same standard of living was $20. The real measure of the worker's welfare is, therefore, not in the *money* wages which he received but in his *real* wage, which is the purchasing power of the money wage. Measured in this way, we find that the real hourly earnings of employees in manufacturing establishments on July 1, 1921 were 32 per cent above 1914. The estimates of the National Industrial Conference Board would show that on Jan. 1, 1922 the real wage, or the purchasing power of the money wage, was 19 per cent above 1914. In other words, the average wage earner in manufacturing establishments was 19 per cent, or approximately one-fifth better off than he was in 1914."

Mr. Alexander then stated that the investigations of the board showed that in the anthracite mining industry the average actual hourly earnings of all workers, including contract miners, increased 162 per cent between June, 1914, and October, 1921; excluding contract miners the increase was 166 per cent. On the railroads, between July 1, 1914 and October, 1921, average hourly earnings increased 131 per cent. The increase, therefore, received by the miners was greater than that of either employees on the railroads or in the manufacturing industries. Converted into real earnings, it appears that the purchasing power of the average hourly earning of the anthracite miner in October, 1921, was 60 per cent above that in 1914. The railroad worker in December, 1921, received a real wage of 44 per cent above 1914.

Then said Mr. Alexander: "We thus have the three groups—the miners 60 per cent better off, the railroad workers 44 per cent better off and employees in manufacturing industries 19 per cent better off at the end of the year, and since there has been no reduction in anthracite miners' and in railroad workers' wages this condition for them has prevailed to the beginning of April. If 10,000,000 wage earners in manufacturing industries have been willing to accept their share in the general wage revision and have not suffered, is there any reason why 2,000,000 railroad workers or 187,000 anthracite miners, should refuse to take their share in the revision movement, especially since their increases have been higher and have endured for a longer period? These are the facts. They have been secured at first hand from actual payroll records. They tell the story simply, but they tell it accurately."

Referring to some fancies about wages, Mr. Alexander referred to the so-called demand for "a living wage for an American standard of minimum health and decency," of which a great deal has been heard in recent hearings on the railroads and in other industries. He stated that Mr. Jewell, head of the Railroad Department of the American Federation of Labor had, before the U. S. Labor Board hearings in Chicago, demanded a minimum wage of $2,600 for every railroad worker. In other hearings this amount ranged between $2,400 and $2,660. To indicate the folly of a demand for any such wage, Mr. Alexander suggested that if each of the 41,000,000 persons engaged in gainful occupations in the United States were to receive an average wage of $2,600 it would mean that the total national income would have to be over $106,000,000,000 a year. The national income to-day is estimated to be $66,000,000,000, so that in order to pay a wage of $2,600 it would require a national income of $40,000,000,000 greater than is now the case.

The Railroads and Their Patrons

L. F. Loree, president Delaware & Hudson Railroad, presented to the convention some of the difficulties which the railroads encounter because of lack of cooperation on the part of shippers. He pointed out the confusion that results from the re-consignment of cars. Some traders re-consign a car five or six times before it reaches its ultimate destination. Although the abuse of this privilege is great, Mr. Loree said that the railroads would not want it withdrawn but he urged carefulness. He also referred to the use of cars for warehousing and said that demurrage charges of $2 a day do not compensate the railroads for the loss of their equipment. He criticised shippers at junction points who sometimes, when there is a car shortage, place orders for cars with two railroads, and he said that shippers often order more cars than they need in the hope of getting enough.

Mr. Loree said there is no great shortage of freight cars, but that many of the cars owned by the roads were returned by the Railroad Administration in such bad condition that they must be completely overhauled for further operation. He said that there would at no time be a car shortage if cars could be kept moving. The roads, he said, are able to keep cars in motion only an average of two hours of 24. In 1920, when everybody was complaining of a car shortage, he said that 50 per cent more cars than his road actually handled were waiting in yards to be unloaded or loaded. Inadequate sidings at plants were given as one cause of such congestion.

Referring to the business situation, Mr. Loree said that in no year of business depression before 1921 had there been a loss of more than 10 per cent in traffic, as compared with the previous year. In 1921 the loss was 30 per cent from 1920. Mr. Loree predicted that railroad traffic in 1922 would show an increase of 15 per cent over that of last year, providing the coal strike did not produce disastrous results in industry. When wages have been readjusted in transportation coal mining, and in the building trades, Mr. Loree said he believed there would be a considerable improvement in business.

He made the interesting statement that for every $3 the railroads spend for new rolling stock, $1 additional must be spent for shop equipment, repair shops, etc.

Conditions in West Virginia

The coal mining situation in West Virginia, with references also to the general strike in all coal fields, was discussed by E. L. Greever of Tazewell, W. Va., counsel for the open shop mine operators, who declared that the United Mine Workers of America had conducted a persistent campaign of misrepresentation regarding the West Virginia situation. He said that when the union miners, several thousand strong invaded Logan county, West Virginia, last September, there had never been any labor troubles in that county.

Mr. Greever said that the non-union miners of West Virginia have resisted being drawn into the United Mine Workers of America, but that the latter organization has resorted to every means within its power, including force and intimidation, to bring about a complete unionization of the West Virginia mines. No coal miners in the world, Mr. Greever asserted, are better paid or have better working conditions than those in the non-union districts of West Virginia, and he declared that there is nothing more vital to the people of this country than the preservation of these non-union coal fields.

He said that the United Mine Workers of America is now a socialized organization and has amended its constitution so that it now demands the "full social value of their product," which Mr. Greever interpreted to mean that they want to take for themselves the total selling price of coal, less transportation charges, leaving nothing for the operators.

If there is a surplus of mine labor, as is claimed in some quarters, Mr. Greever said that the consumer and the operator should not be obliged to pay the bill. He declared that some of the miners brought into court following the recent West Virginia troubles disclosed that their incomes were larger than that of the judge on the bench.

He said that the leaders of the United Mine Workers of America favor Government ownership or control of coal mines because they "rely on Government inefficiency and political cowardice" to give the men their demands.

Apprenticeship Training

One of the accomplishments of the association within the past year has been the completion of what is believed to be an ideal plan of apprenticeship training. The report of the committee on industrial training, which has charge of the preparation of an industrial training manual, was presented by Harold C. Smith, its chairman, who is president of the Illinois Tool Works, Chicago, and president of the Chicago branch of the Na-

tional Metal Trades Association. Mr. Smith's report was as follows:

During the recent extraordinary activity consequent to and following the world war, the educational efforts of this association were concentrated upon training systems that would serve to rapidly induct new workers into the members' shops through teaching them the rudiments of special operations and providing means for the upgrading of those who showed aptitude and ability.

The committee feels that this special training should continue in all shops where it can be applied, as the great majority of those in the industrial army under the modern system are specialists and operators of automatic and semi-automatic machinery. It has been clearly demonstrated that these special training systems reduce the time necessary for teaching a process or series of operations, allow the operator to earn full wages in a comparatively short time, provide a means for upgrading of those already at work and furnish a way to prepare those with capability for promotion to better jobs. The service that was rendered by the association to determine the combination best fitted to the individual shop is still available and may be had by application to the national office.

Investigations have shown that there is another phase of industrial education that needs serious attention. It has been found that there is a great dearth of highly skilled all-round mechanics. Inquiry has shown that apprentice training, so necessary for producing this type of man, has been neglected and in many lines of industry has been entirely abandoned. It is an accepted fact that if our country is to maintain its supremacy in industry, there must be more men trained who can design, build and maintain the necessary automatic and semi-automatic machinery and jigs and fixtures, and also intelligently lead and direct the workers.

In the report of the Committee on Industrial Education which was made at the last convention, it was pointed out that there was a renewed interest in apprenticeship training by the employers, the prospective apprentices and the guardians of the latter. Investigation of this matter led to the conclusion that if the interests of the employee, the employer and the association were to be served, it would be necessary to establish certain definite minimum requirements which would insure fairly uniform training regardless of method used, size of plant or locality in which the training would be given.

Accordingly, efforts were directed during the year toward developing a manual on apprenticeship to be used as a guide and suggestion for the development of apprenticeship courses. During this development, conferences were held with the executive boards and committees on apprenticeship and education in the various districts. The manual was discussed with interested members and also with interested persons outside the association. Much constructive criticism was received and finally this resulted in the "Manual on Apprenticeship in the Metal Trades" which will be presented for approval today. Enough copies have been printed for distribution at this convention and the type has been left standing en bloc to permit changes in the text. Suggestions and criticisms received during these sessions will be considered for incorporation in the regular issue of the manual.

At the last convention, two recommendations were made by this committee: first, that a definite number of learners, in proportion to those employed, be trained in each shop. Second, that a committee on industrial training be formed in each branch to handle matters pertaining to technical, vocational, part time and continuation schools and to consider ways and means of furthering training and education within the plants of the members. The second of these recommendations has been followed in the majority of the branches, and the committee urges that action be taken by those districts that for some reason have delayed doing so.

The committee suggests that each member read the manual carefully, pass it on to others of his executive staff and adopt some method of training which will fit the needs of his plant and production methods. The field man is ready to confer with any of the members, will gladly make a survey of the individual plants, and recommend a combination of training methods which will apply to the particular shop.

The Banquet

At the banquet Wednesday evening the toastmaster, John W. O'Leary, first introduced former United States Senator Charles Thomas of Colorado, who was followed by Dr. William H. P. Faunce, president Brown university, Providence, R. I., and Howard E. Coffin, vice-president of the Hudson Motor Car Co., Detroit, who was a member of the advisory committee on aircraft in the Council of National Defense during the war. Mr. Coffin showed the developments in aeronautics since the war and made the assertion that the progress in bombing from airplanes, as demonstrated at the recent maneuvres off the Virginia capes, was a vital influence in the quick acceptance of the American plan of naval limitation at the Washington conference called by President Harding. Mr. Coffin stated that 1300 bombing airplanes could be built for the cost of one modern battleship, and that with this number of effective airplanes no battleship fleet could approach our coast successfully. He showed with still pictures and movies what has been accomplished toward the more effective use of airplanes in warfare, indicating that much progress has been made since the late war.

Commercially, he said, the United States has made slower progress than the nations of Europe, but he predicted that before long regular travel between such important centers as New York and Chicago would be an accomplished fact. He said that such travel would probably be by large dirigibles capable of carrying 100 persons in the same degree of comfort as they are now transported by the Twentieth Century Limited. To those who are skeptical regarding the future progress of aeronautics, Mr. Coffin recalled that only 20 years ago the automobile was in such a state of imperfection that on an endurance test from the Waldorf-Astoria Hotel, New York, to Grant's tomb, a distance of only a few miles, only four cars out of 15 or 20 completed the run. He did not believe that the time would ever come when airplanes would be as freely used as are automobiles to-day, but he indicated an abiding faith in substantial progress to be made within the next few years, which, he said, would be accelerated by the rapid adaptability of the radio telephone, which will overcome many of the handicaps of airplane travel.

Steel Corporation to Start on $15,000,000 Tube Plant at Gary

Reference was made in THE IRON AGE of Feb. 2, page 359, to the probability that work would be begun actively on the project for the building of an extensive tube plant at Gary, Ind., by the National Tube Co. Chairman E. H. Gary announced on April 21 that the work would proceed, and at the same time it was stated on behalf of J. P. Morgan & Co. that subscriptions had closed for a $7,000,000, 5 per cent bond issue of the Indiana Steel Co. and a $3,000,000, 5 per cent bond issue of the National Tube Co. The remainder of the $15,000,000 required for the financing of the new project, it was stated by Chairman Gary, would be provided from the Steel Corporation's surplus. The new plant is to have a capacity of 350,000 tons a year for the manufacture of lap and butt weld tubes.

The first announcement of the plan to build a tube plant at Gary was made by the Steel Corporation in 1917. At the beginning of each of the three following years, in connection with the Steel Corporation program of new construction, an item which regularly appeared was the following: "A self-contained tube plant at Gary, Ind., including four blast furnaces." It is probable that two or three years will be required for the carrying out of the complete construction program.

It is understood that the building of blast furnaces and steel plant in connection with the new National Tube Co. unit at Gary is not a part of the new construction that is now to be pushed forward. The fact that a $15,000,000 expenditure is involved in finishing plant alone gives some idea of the scale of the new enterprise, but more particularly suggests the great outlay required under latter day costs of steel and rolling mill plant of any description.

The Noiseless Typewriter Co., Middletown, Conn., has sold to banking interests for $1,000,000, 20,000 shares of common stock of no par value. The money will be used to pay off floating indebtedness and to develop the business.

Gear Makers Discuss Industry's Problems

Technical Papers and Consideration of Commercial Conditons Feature Meeting Last Week in Buffalo —Some Progress in Standardization

THE Buffalo meeting of the American Gear Manufacturers Association proved that general business conditions had given a set back to the standardization movement which has been such a conspicuous feature in the activities of this organization. Temporarily more concern was indicated over the need of wider appreciation among the membership of the importance of uniform cost accounting. Almost a half of the member companies have made no expression of approval or disapproval of the various reports and suggestions of the association's committee on the subject, and the informal comments of those present at Buffalo were numerous that prices claimed by buyers proved that quotations were apparently too frequently without relation to costs. There were no indications that gear makers have any stocks yet to be liquidated; and the writing off of inventories, as under the allowances of income tax statements, for example, has proceeded apparently in the regular way and the admitted betterment in business inquiry was held to give the incentive, if nothing else, to figuring hereafter with an eye to cost sheets.

Steady progress in smoothing out differences toward establishing standards was quite evident, but rounded out reports were conspicuously lacking in comparison with the developments which had occurred in previous intervals between meetings. The after view of the meeting is, however, that with the heartening given by the upgrade in business activity standardization is to be continued with a renewal of the energy which has been noteworthy in the gear-making industry. The remarkable spirit of camaraderie which this group of competing manufacturers has shown from the first marked this last gathering, and as an aggregation working for improvement in business and in technical practices, it can be said to show the way to some older organizations of the same purpose.

Officers Re-elected

The Buffalo meeting was the sixth annual meeting, and it was held at the Hotel Lafayette, April 20, 21 and 22. It re-elected, through its executive committee, the officers who served last year, including F. W. Sinram, Van Dorn & Dutton Co., Cleveland, who has been president since the inception of the organization. Mr. Sinram has been desirous of turning over the headship to some one else and had been positive he would not take the office again. Meanwhile the sentiment of the membership had been sounded out and Mr. Sinram, overwhelmed by personal solicitations and by a batch of letters and some telegrams sent to Secretary Hamlin, was persuaded to remain president for another term. It was a noteworthy tribute of confidence in and esteem for a man, and in accepting, he emphasized that in this coming year every man has got to do the jobs assigned to him.

As members of the executive committee J. B. Foote, Foote Bros. Gear & Machine Co., Chicago, and E. J. Frost, Frost Gear & Forge Co., Jackson, Mich., were re-elected for three years, and C. F. Goedke, William Ganschow Co., Chicago, and W. H. Phillips, R. D. Nuttall Co., Pittsburgh, were elected members for three years. They, in turn, in an organization meeting, returned as officers: President, Mr. Sinram; first vice-president, R. P. Johnson, Warner Gear Co., Muncie, Ind.; second vice-president, B. F. Waterman, Brown & Sharpe Mfg. Co., Providence; treasurer, F. D. Hamlin, Earle Gear & Machine Co., Philadelphia. Mr. Hamlin was elected secretary a year ago for a term of two years.

As has lately been the case, each session provided for a technical paper and the consideration of a number of committee reports. The work of the association consists largely in specialized study of standardization through committee meetings and correspondence between association meetings and filing reports for discussion, elucidation and finally approval in whole or in part. The papers presented included: "Good Hob Practice," by H. E. Harris, H. E. Harris Engineering Co., Bridgeport, Conn.; "Use of the Projection Comparator for Testing Gear Teeth," by Ralph E. Flanders, Jones & Lamson Machine Co., Springfield, Vt.; "Proportions of Industrial Gears," by G. E. Katzenmeyer, R. D. Nuttall Co., Pittsburgh, and "Grinding of Gear Teeth and Its Future in the Industry," by R. S. Drummond, vice-president Gear Grinding Machine Co., Detroit.

Commercial Conditions

Two features of the meeting were discussions in executive session of business conditions in the marketing of industrial gears and of conditions obtaining in the automotive gear field. They were designed to take account of stock, so to speak, or to provide for the orderly concentrated discussion which would otherwise be fitful, as two or three could exchange experiences between sessions, and to give in a measure the basic information corresponding to the statistics available for other industries but not available for the gear industry. Representatives of THE IRON AGE and other business papers were in attendance. The comments crystallized into an acknowledgment of an expansion in recent weeks in the number of inquiries and of inquiries of a positive rather than of a merely testing nature and that there was a definite movement on the upgrade of improvement. President Sinram, in opening the convention on Thursday morning, April 20, said:

"Complimentary to it, the gear industry, fundamentally conservative, with the exception of a dent here and there, presents a firm front. While I believe it important preliminary to our deliberations here that we start out with a full appreciation of the facts, it is not my desire to sound a pessimistic note. On the contrary, as you who know me best appreciate and my record with you proves, I am naturally optimistic. Like the prophets, from experience and observation, I believe we are on the upgrade. As I observed at Cincinnati a year ago and still contend—and events are verifying my conclusions—'The normal of to-morrow will not be the normal of yesterday.'"

As to the commercial activities of the association, he said these should receive greater consideration from now on than has been accorded them. "Until recently, riding on the waves of unprecedented times, few have appreciated the importance of concerted constructive effort in this direction. Regardless of initiative, progress in any direction can be had only when a material proportion of the industry is receptive and ready and willing to co-operate. Hereafter we may well devote no small part of our program to subjects commercial—and a new era having dawned with a new normal in prospect, receive presentations on subjects of common interest from within and without our membership.

"First and foremost the present demands constructive effort on the part of each and all, that we may stabilize our industry and do our part in giving stability to business in general. The good will created by the A. G. M. A. and manifested on every hand should prove no small factor in the stabilization of the industry.

"Now, regarding the technical—known among us as standardization—I shall only make a few observations as our able chairman of the general standardization committee, as usual, can be depended upon to cover the subject in detail in his report. The adoption of the standardization program to which we are now committed was a distinct step forward. Our activities have

attracted the attention of the entire mechanical world—and it is looking to us for results."

Secretary Hamlin reported a membership of 94 companies, 109 executive members and 53 associate members. He referred to the fact that the association came into existence—in 1917—with the same conditions of business as obtains to-day. "It requires grit and backbone to do business at the present time," said he, "but honesty and square dealing will work out in the long run." The Automatic Gear Works, Atlanta, Ga., and the Willys-Morrow Co., Elmira, N. Y., were elected to membership. Of the latter F. H. Higgins and T. W. Tidd are the executive members.

Cost Accounting

A brief report of the committee on uniform cost accounting was made by the chairman, J. H. Dunn, R. D. Nuttall Co., Pittsburgh, who pointed out that a report had been made at every meeting in the last four and one-half years. A certain sizable percentage of the membership has not responded to the various questionnaires and though a considerable number had adopted the recommendations of the committee, Mr. Dunn intimated that too many refrained from expressions on the subject. He suggested the possibilities of district cost bureaus or of the employment of a traveling accountant to devote, say, all of his time to the question. Finally the thought was that valuable suggestions would come out of the discussions on industrial conditions in both the jobbing and the automobile fields and that Mr. Dunn might meet with the executive committee to see what could be done to extend the appreciation of uniform cost accounting.

J. B. Foote, Foote Brothers Gear & Machine Co., Chicago, as chairman of the industrial relations committee, discussed the need of making the machinists' trade attractive enough to secure apprentices. He considered that inventions are not likely to come from the specialists but from the all-round man who has the horizon necessary for basing new designs. References were made to the pamphlets which had been prepared by the National Metal Trades Association covering several workable apprenticeship systems, and through Mr. Foote or the association an effort will be made to supply copies to those interested.

The Progress in Standardization

In his report as chairman of the association's sectional committee of the American Engineering Standards Committee, B. F. Waterman enumerated the various gear standards which had been passed on to the American Engineering Standards Committee as tentative standards. These included railroad gears and pinions, starting motor pinions (in collaboration with the Society of Automotive Engineers as the other sponsor society), spur gears, composition gears and the recommended practice covering the inspection of gears.

As chairman of the general standardization committee of the organization, Mr. Waterman indicated progress in incorporating minor changes. The formula given in the association's standard for the strength of herringbone gears has been questioned, it appears. A. F. Cooke, Fawcus Machine Co., Pittsburgh, chairman of the subcommittee on herringbone gears, pointed out that the question arose out of differences due to the use of the gears, such as applications to ship transmissions. The committee tried to limit the formula to the conditions of general commercial applications and eliminating what is always considered as a special branch, such as marine power propulsion. The point was made that the limitations of the formula, so to speak, should be indicated, that it is recognized as a widely used formula and should be so accepted. Major Earle Buckingham, Niles-Bement-Pond Co., emphasized that little is really known about tooth strength, owing to the variety of conditions of use. W. H. Diefendorf, Diefendorf Gear Co., Syracuse, N. Y., reminded the meeting that the same thing could be said of spur gears, that an allowance must be made as for gearing forming part of calendaring rolls in a rubber mill. Mr. Cooke remarked that many cases have to be regarded as engineering problems. A gear system for a 1000-hp. rolling mill motor may be required to care for a sudden load of 2500 hp. together with 1000 hp. of flywheel effect, or 3500 hp. in all. Outside of the special engineering applications, he had used the formula satisfactorily for eight or nine years in pumps, mine hoists, turbine installations and in motor transmission. Major Buckingham contended that the formula does not belong to a definite dimensional standard, such as the herringbone standard; a little change will occur in the latter, but much is likely in the matter of the expression of strength. C. B. Hamilton, Jr., Hamilton Gear & Machine Co., Toronto, Ont., held the formula is needed to know the factor upon which to base peak loads; the factor is unity in the normal application and other than unity in the special application.

Gear Testing Machines

Discussion developed regarding apparatus for testing gear strength, such as ascertaining stresses in relation to speed, as one member emphasized. John Christensen, Cincinnati Gear Co., Cincinnati, told of plans to have work done at the Universtiy of Cincinnati, including the testing of composition gears, comprehending the determination of the force at the pitch line sufficient to break the tooth. Mr. Christensen has agreed to supply the gears needed for the tests.

Closely allied with this subject was one taken up in connection with the report of the committee on gear inspection, E. J. Frost, Frost Gear & Forge Co., Jackson, Mich., chairman. Conference has been had with Professor White of the University of Michigan and Professor Rice, of the department of physics of that university. Their proposal is for the building of a soundproof room in which would be placed the gear train under test. By means of organ pipe or tuning forks of known pitch the reverberating properties of the room could be calibrated and the wall transmission of sound determined. The investigations proper would include measurements of sound emissions of the gears at various speeds and pressures. The prominent sound pitches could be ascertained as well as the volume and thus a basis for correcting troubles. A rough estimate of the cost was as follows: Room, $500; apparatus, $300; mechanician's services, $600; one half of time of laboratory assistant, $900; supervision, $1,200; total, $3,500. The suggestion was made that Professor White be invited to a later meeting to discuss the subject. The thought was expressed that the expense might be divided equally between the gear manufacturers and the automotive industry. Reference was made to the fact that the Society of Automotive Engineers has a research bureau which might be financially interested.

As respects testing for gear strength Mr. Waterman felt it was desirable to learn what other research bodies are planning, such as the research section of the American Society of Mechanical Engineers. Tests, it appears, are in progress in California. The thought was that money contributions ought not to be made until there is assurance that all concerned are on the right track.

Backlash for Bevel Gears

The report of the committee on bevel and spiral bevel gears, F. E. McMullen, Gleason Works, Rochester, N. Y., chairman, covered a formula for expressing backlash and discussed the adjustment of bevel gears in an assembly, the latter part including sketches of what happens in improper assembly. Backlash by the formula for gears above 2 diametral pitch is equal to 0.01 in. times the circular pitch or 0.0314 in. divided by the diametral pitch. The backlash specified must be measured when the pitch lines of the gears are together.

Keyway Standards

At the Saturday morning session several more reports by standardization subcommittees were presented. Lars Nilson, Nilson-Miller Co., Hoboken, N. J., reporting for the keyway committee, said that he had only a progress report to make. A great many tables of key and keyway sizes had been published, and while most of them agreed pretty closely in regard to width of key, they were not in very close agreement with respect to depth of keyway. At present, sentiment seemed to favor the use of square keys for shafts up

to 3 in. diameter and of flat keys for larger shafts. The A. G. M. A. was one of the sponsor bodies in the general American standardization movement, and it was necessary to bring about agreement between the committees of the sponsors. The mechanical engineers had recommended a double standard, covering both square and flat keys for all sizes of shafts.

The A. G. M. A. committee was of opinion that there should be only one standard key for any given size of shaft and recommended square keys for shafts up to 3¼ in. in diameter and flat keys for larger shafts. The committee in a table it had worked up also gave sizes of flat keys for shafts up to 3¼ in. diameter and for square keys for larger shafts but wanted to designate these keys as a second choice and not as the standard. In the case of the flat keys, the depth of the key was taken as equal to the nearest 1/16 in. size to two-thirds of the width of the key. Tolerances for keys and keyways were also given in the table, and these agreed with the tolerances adopted by the British Engineering Standards Committee and the proposed A. S. M. E. standard. Upon discussion, it was decided to have the report multigraphed and distributed to the members for their comment.

Opposition to Term Semi-Steel

C. B. Hamilton, Jr., reported for the metallurgical committee. In connection with this report two charts giving the heat treatment temperature ranges for different steels, based upon the carbon contents of the steels, were presented. Mr. Hamilton said that charts for all of the A. G. M. A. steels, based on S. A. E. recommendations recently published, were in preparation.

The metallurgical committee made the suggestion that the term "cast steel" be dropped in connection with gear steels, owing to the fact that this term is much used for designating certain kinds of tool steel, and that "steel casting" be used instead. It was also suggested that the term "cast iron" be dropped and that the more specific "gray iron" and "white iron" be used instead. It was further suggested that the term "semi-steel" be abandoned and that the material referred to be described as gray iron with a certain amount of scrap steel. There was some discussion on the proposed change in nomenclature. It was asserted that the use of the term "cast iron," which was so firmly established in the industry, could not be readily discontinued. On the other hand, there has been a great deal of objection to the use of the term semi-steel, which has always been regarded as a misnomer. Both the S. A. E. and the A. S. M. E. were opposed to the term "semi-steel." There are now no established specifications for this material, but the S. A. E. is planning to draw up such specifications. Mr. Frost said that his firm commonly used such an expression as "25 per cent semi-steel," which meant gray iron with 25 per cent of steel added, but he admitted that it was poor terminology as a material could not be both "25 per cent" and "semi."

To Test Steel Grain Structure

The recommendation also included a change in the steel casting test specifications. It was proposed to grind and edge a section of the casting and then examine it with respect to grain structure, and requirement was to be made that the coarse structure characteristic of unrefined cast steel must be completely absent. In this connection some discussion arose on the point as to just how this test was to be applied. Some members feared that if the gear makers were to be too strict with the steel founders it would result in an increase in price. On the other hand the opinion was voiced that, inasmuch as the gear makers were held responsible for the material in their gears by their customers, they in turn, must hold the suppliers of this material responsible. One member mentioned that the Bethlehem Steel Co. had arranged to test every ingot in substantially the same way as suggested by the metallurgical committee. The test could be made by very simple apparatus, without the use of a microscope, and was in no way burdensome. Upon the matter being put to a vote the steel casting specification was adopted. Mr. Hamilton also made a motion for the adoption of the nomenclature recommendation, but owing to the opposition developing withdrew his motion with the understanding that the terms "cast iron" and "semi-steel" be avoided as much as possible.

As a part of the report of the metallurgical committee S. P. Rockwell read a paper on recommended practice in the selection, test and use of carburizing materials and the designs and use of carburizing pots.

Ground Gears

At the closing session on Saturday afternoon R. S. Drummond, vice-president Gear Grinding Machine Co., Detroit, presented a paper on the grinding of gear teeth and its future in the industry. He pointed out that it was the demand of the automobile industry for gears that would run quietly at high pitch line velocities which led to the introduction of gear grinding. So far the greatest number of gears with ground teeth had been used in automobile construction, but gear grinding was now also being introduced to other lines of work. For instance, some gears are now made of high manganese steel containing approximately 13 per cent manganese. This steel alloy is so hard that it can be machined only by grinding. The driving gears of gear-driven locomotives and of multi-engined airplanes are also being ground.

There are essentially two classes of gear grinding. In some cases gears which originally were not intended to be ground are so greatly distorted by the heat treatment that they are very noisy and are then salvaged by grinding their teeth faces. This, of course, increases the backlash in the gears, but Mr. Drummond said that in transmission gears a backlash as high as 0.015 in. is not objectionable. In regular operation there is no reversal of the drive and hence no noise due to the backlash.

The second class of gear grinding is the finish grinding of gear teeth which have been rough-cut and have had sufficient stock left for grinding. This constitutes the largest volume of gear tooth grinding today. The gear grinding process was introduced about twelve years ago but up to a year ago its chief use was for salvaging gears that had been ruined by distortion.

The last item on the program was a paper on the Gleason Works system of bevel gears presented by F. E. McMullen and T. M. Durkan. The Gleason Works showed to the A. G. M. A. at its meeting in Rochester last fall a new system of bevel gears which they had worked out and which they intended to offer to the A. G. M. A. as a standardized system of bevel gearing. The system then presented was worked out with a view to securing maximum rolling and minimum sliding action—in other words the highest transmission efficiency. It was found, however, after a number of samples had been made and tested out in practice, that they were rather more noisy than gears made to the old designs. The system was therefore discarded and a new system designed chiefly with a view to silent operation, and it was this system which was explained at the Buffalo meeting.

Mr. Durkan, who read the paper, pointed out that the bevel gear systems now in use were based entirely upon spur gear practice. In the design of a spur gear system, the great object in view was interchangeability of gears of all sizes from 12 teeth to a rack, and in order to attain this object sacrifices were made in respect to other desirable qualities. Now, in bevel gears there is no interchangeability, as for a right angled drive a bevel pinion will mesh properly only with a gear specially designed for it, and the sacrifices made in order to insure interchangeability in the spur gear system therefore afford no corresponding advantage here. One of the requirements of interchangeability is a constant pressure angle for all sizes of gears. This has been abandoned in the new system of bevel gearing and three different pressure angles are used, of 14½, 17½ and 20 deg. Mr. Durkan explained the complete system, using a number of diagrams illustrating it.

The Banquet

At the dinner Friday evening John C. Bradley, Pratt & Letchworth Co., Buffalo, pointed out how the

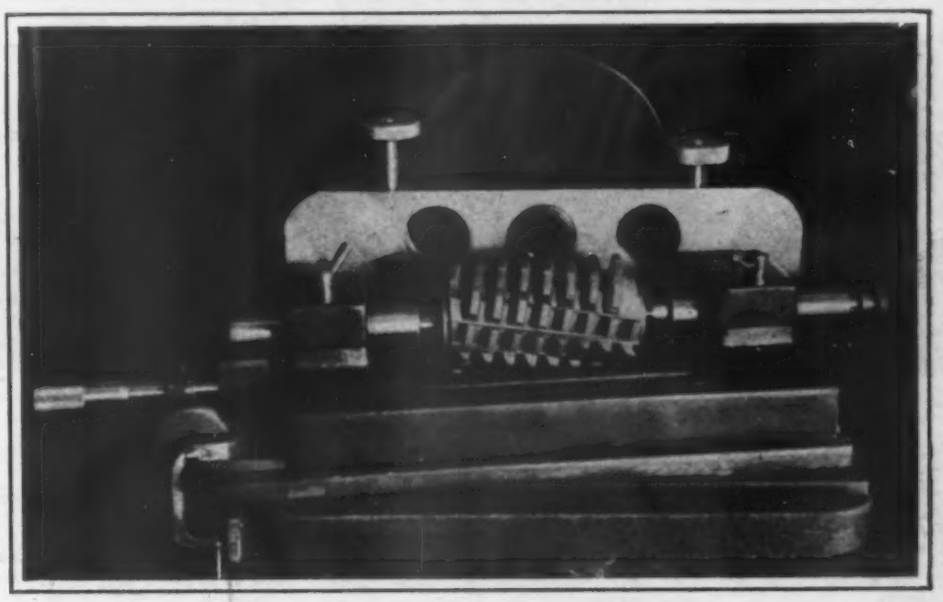
actions of the legislators in Washington were restricting business, dwelling on the extreme taxation from which business is suffering. He emphasized that notwithstanding these deterrents, "we are well on the road to recovery. Of course," said he, "those accustomed to wartime prosperity may not be satisfied with the volume of business of the immediate future but compared to a pre-war average it will be more than satisfactory. Sane prosperity is ahead as contrasted with wartime excesses."

The high spot of the speech was the reference to railroads. According to Mr. Bradley the railroads are in worse condition than they were five years ago. They have been crushed by Government control and regulations but wonderful improvements have been made since they have been returned to private control. There is not enough equipment to move the crops that there are ahead of us but the railroads are now buying locomotives, cars, rails, etc., to prepare themselves. By the end of this year companies such as his, doing business with the railroads, will not be able to supply the demand.

Inspecting Gear and Gear Cutters at One Hundred Magnifications

THE first public presentation of an invention for use in connection with the Hartness comparator for testing gear teeth was one of the features of the meeting of the American Gear Manufacturers' Association. Ralph E. Flanders, of the Jones & Lamson Machine Co., Springfield, Vt., of which James Hartness, governor of Vermont, is president, described it in connection with an address on "The Use of the Projection Comparator in Testing Gear Teeth." What Mr. Flanders had to say was in part as follows:

"For gear and gear cutter inspection the comparator had to be entirely rearranged. The cutter is mounted on a true arbor between dead centers in front of the lens. The microscope in this case must have a large aperture to take in the whole tooth. A stop is provided against which the cutting face registers to keep it in the vertical plane for which it is focused.



The Gear Cutter Is Mounted on a True Arbor Between Dead Centers in Front of the Lens. The microscope had to have an aperture large enough to take in a whole tooth

"To get the required degree of magnification (say 90 or 100 diameters for the work) at a distance of 5 ft., where the operator can observe it and at the same time manipulate the work, would require an angle of projection so wide that no lens system can be devised to preserve both freedom from distortion and achromatism, or freedom from color bands.

"We are therefore led to the expedient shown of reflecting the image against a mirror placed at a distance and bringing it back to the operator's position where it is received on the back of a ground glass screen. On the front of this the operator can work freely, drawing lines or erasing them, comparing the image with his drawings, etc., all without throwing his own shadow on the screen at the operating position of the apparatus. What is equally important, a considerable group of men can examine the image at close range without interference.

"The mirror, it should be noted, is not an ordinary one with a 'silvered' or amalgam back, but has an actual deposit of silver on its front surface from which the reflection is made. The accuracy of the result can be judged from the fact that with a magnification of 100 diameters differences of 0.0001 in. can be detected.

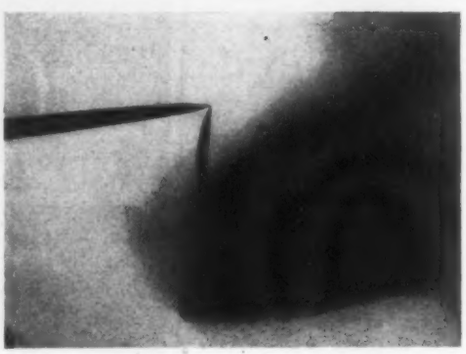
"The machine set up as shown may be used to test the regularity of the teeth, one with another. If the outline of the first tooth projected is carefully drawn on the screen, successive teeth may be indexed around into position and compared with the first one. By this means we may discover differences in outline, whether due to hardening distortion or inaccurate grinding; and also any run out of the teeth whether sidewise or radially. Furthermore, the teeth of a cutter giving satisfactory results may be compared with one which is not satisfactory and the reasons determined. By reversing the cutter on the arbor it can be determined whether or not the tooth outline is symmetrical. All the above determinations result from the use of the machine as a comparator.

"The inspection of a hob is carried out in somewhat the same way as for the cutter. There is, however, the additional element of lead variation to consider. This is taken care of by mounting the hob, its arbors and the centers on which it is mounted in a frame which rolls on ball bearings in tracks, machined in the base of the device. The advance of each tooth is measured by matching it with the outline on the chart, and reading the axial distance moved from the micrometer, or by means of Johannson blocks, or both.

"In projecting cutter outlines, a sharp, definite character is given to the cutting edges. With gears themselves, however, the problem is a serious one. The edge is rubbed over on the entering side of the cut and provided with burrs on the other side, which cannot be removed with any assurance that the true outline will be retained. Worse than this, many gears, especially in automobile work, have the teeth chamfered at one or both edges, thus making a reliable outline impossible.

"Until recently, the best method available was to clamp a thin sheet of metal between two thicker blanks of the same material and cut teeth in all at the same time. This produced a thin template, practically free from burrs, and of correct outline, and thus suitable for projection. This was all right theoretically, but such a gear could not be tested in actual running, nor could it be compared with one which had been run.

The Image Is Reflected Against a Mirror of Silver and Brought to the Operator's Position on the Back of a Ground Glass Screen. On this the operator can draw and erase lines at will. A gear is placed so that the tooth surface makes a slight angle with the optical axis in a direction which tends to display the tooth surfaces to the microscope. The silhouettes of the needles and their reflected images allow for locating accurately the tooth contour



The problem was thus practically unsolved. What was needed was some method of projecting and tracing the tooth outline on any section from one end to the other. This difficult problem was solved in a very simple and beautiful way by Messrs. Beardsley and Porter of our organization, and I take great pleasure to-day in giving you the first public demonstration of their invention.

"If a gear with ground, lapped, or otherwise polished tooth surfaces is placed so that the tooth surface makes a slight angle with the optical axis (say 1 deg.) in a direction which tends to display the tooth surfaces to the microscope, we notice an interesting thing. The diagram on the screen tends to show an outline on the focal plane, whether that be located close to one end of the tooth or somewhere midway. This is due to the fact that the microscope tends to define anything in the focal plane and confuse everything else. Owing to the 'thinness' of the focal plane of these special microscopes, the infinitesimal details thus picked out tend toward a sharp outline, but yet not sharp enough for practical purposes. How shall this outline be developed?

"It was done in a most simple manner. As shown, a needle was mounted and focused in the plane it was desired to explore, and then the tooth outline was traced by its point. The junction of the point and its reflection furnished a location for the surface measurably accurate within 0.0001 in.; and it made possible the rapid drawing of the outline with nearly this degree of accuracy. With the outline once drawn, other teeth of the same gear, or of other gears, can be likewise indicated with the moving needle point, and satisfactorily compared with the drawn outline.

"For extreme accuracy the reflected image of the needle is required, but this does not confine the use of the process to highly polished surfaces. Even roughly cut,

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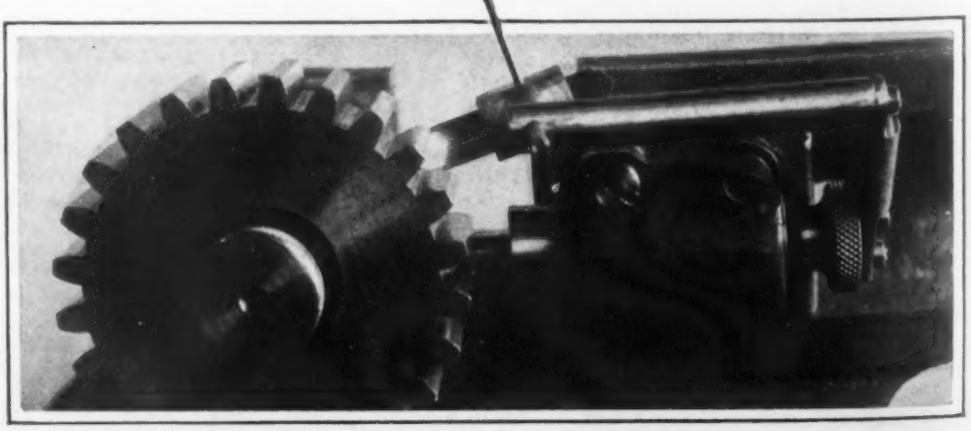


When a gear is mounted in the fixture as shown, the needles are made to approach the tooth outline, stopping in contact with it for its entire length from top to root

Machine Tool Builders' Readjustment

Period of Depression Used to Put Shops in Order and Improve Designs, Says President Tuechter at Atlantic City Meeting of National Association

IN opening the annual convention of the National Machine Tool Builders' Association at Atlantic City, N. J., Tuesday, April 25, President A. H. Tuechter said that as he looked back on the last 18 months, it saddened him to think what the machine-tool industry has gone through. He described some of the losses it has incurred as "unnecessary and avoidable." "As I look about," he added, "I see other industries that are much better off because they were ready for the slump—good association work warned them of what was coming. How much loss our industry could have been saved if, before 1920, we had developed the constructive service such as we have been developing by the last 16 months' work!

"The Bible tells us that 'He who perseveres to the end shall be saved.' Surely those lacking in perseverance are out of place in the machine tool business. From the high peak of war in 1917 or 1918, machine tool demand has dropped to the worst condition any of us have ever seen, and probably relatively the worst the industry has ever known. But are we downhearted? No! emphatically no! Serious we are, of course; who wouldn't be serious in times like this, with orders dragging bottom for nearly two years past? The slow recovery of the world from its war debauch affords good reasons for us to take a serious view of life just now. But are we supine—crushed? Far from it. Every well run shop in the industry has been overhauled; its equipment is put in tip top shape, ready to go when the world gives the word. The drafting room of every well run shop is busy on improvements. When the world again needs new machine tools, we will be there with tools so good that the world will have to throw its old ones on the scrap heap. Perseverance and courage have always marked this industry in every depression, and they mark it now, as always before.

Much Constructive Work

"Looking back on the 18 months of my stewardship as your president, I see much solid constructive work that we have accomplished in the face of all the discouragements we have had. Seeing that, I am proud to have been your president, and to have contributed my share to the betterment of the industry to which I owe so much.

"In saying that our association has done constructive work for the last 18 months, I am not alone in my judgment. A number of men and organizations outside of our ranks have realized that we are a reborn organization, worthy of increasing respect. As our constructive work increases, this conviction will grow, and our industry will get greater consideration than heretofore at the hands of our customers. As our association work shows us to be an active, progressive industry, our influence will increase in the estimation of other industries whose leaders know that association effort is well worth its cost.

Study of Business Depressions

"Our members will recall that in September they received a digest of Prof. Wesley Claire Mitchell's wonderful book on business cycles. This bulletin, prepared as a result of much study by Mr. DuBrul, was entitled 'When Is Business Normal?' It was so good that the Chamber of Commerce of the United States asked for copies for distribution to its board of directors. One of these men said that preparing that digest and distributing it to our members was one of the most constructive pieces of association work that had ever come to his notice. Another called it to Secretary Hoover's attention just before the Unemployment Conference convened, and we were asked by telegraph to furnish 100 copies for the use of the conference, which we were glad to do.

A Puzzling Problem

"One of the most puzzling problems in the study of cycles is to trace the action and reaction of interdependent industries and how their supply and demand influence each other, and precede and follow each other. Through discussions of the business cycles at the meeting of the American Statistical Association, held during the Christmas holidays, Dr. Mitchell became acquainted with some of the work Mr. DuBrul has been doing to figure out our industry's part in this Chinese puzzle. Mr. DuBrul called attention to the fact that economic theorists had not dwelt much on inelasticity of demand as a factor in the fluctuations of different industries, and that this was worthy of deeper study. He advanced the proposition that the more inelastic an industry's demand, probably the more violent would its fluctuations be found, and of course the more the fluctuations, the greater the risk of the business, and the higher the price the fluctuating industry must get to live. He pointed out that managers of equipment industries like ours must take such conditions into account, if they are to avoid disasters. After economic crises, prices come down, regardless of the cost of previously completed product. Industrial equipment has no demand in and of itself; its market is derived from demand for consumer goods. Therefore, even though prices get so low as to be disastrous to the machine builder, such prices then have little effect on stimulating sales for machinery when the user of the machinery has a shop filled with idle equipment.

"Over-estimation of demand that results in the accumulation of excessive stocks built at high costs likewise depletes cash reserves. Pressure to sell when there is no will to buy often drives prices below reproduction costs; particularly so in an industry that finds itself stocked up greatly in excess of a small and inelastic demand. Then, just when the market is naturally weak, and extra pressure to sell is created by the weakened state of the cash reserves, temporary over stocks of any commodity are cleared by speculative or anticipatory purchases, rather than through purchases for reasonably nearby requirements. But as low prices have little effect in stimulating users to make anticipatory purchases of machinery, this leaves only the speculator to fall back upon, and as machinery is not a commodity that the speculator can easily get rid of, no price would clear the stocks unless it goes so low that speculators would recognize it as being far below any fair cost of reproduction. Even if cleared from the warehouse of the overstocked builder, those machines would still glut his real market, which is the user's market until the demand for other goods required the installation of more equipment.

"For these reasons, overstocking of machines just as a boom has passed is disastrous to the builder, who is afterwards compelled to sacrifice that stock from financial necessity. He is sure to suffer much greater losses than need be suffered by manufacturers of consumer goods, because the latter can be moved by less sacrifice in price.

"Reliable forecasts of a coming fall in our demand are of great value. With such forecasts, managers in our industry will be able to avoid disaster by learning to keep their finances sound; by learning when to stock and when not to stock; by learning when to run ahead of demand, and when to hold operations close to demand. Our industry is a risky one, due to these inherent difficulties.

"As demand goes down, equipment industries must

choose between the breaking up of their organizations on the one hand, or financial disaster on the other. Our industry would also be benefited by having reliable forecasts of revival of demand, so that after costs are reduced through operation of the cyclical forces, the industry can again put men to work in advance of the next rise in demand. All equipment cannot be made for stock, and the builder of non-stock machinery always faces the difficulty of building his force when the labor market is short of men.

Studying Cycles

"In this depression, with more information available, business men are studying the cycles and their lessons as never before. It is to the credit of this association to be able to contribute something of real value to that study, and to be recognized as attempting to solve its own part of the problem by getting down to bed rock principles. The better we business men can read the signs of a coming crisis, the better prepared can we be to avoid its bad effects. The more we each learn to control our own businesses sensibly, the less violent will be the fluctuations in all business.

"The industry should not falter in the work it has started, and by which it can again put itself in a healthy condition. True, we are spending more money on our association's work than we did two years ago, but that is only because we did not spend enough two years ago. Be sure that to-day we are not spending too much. The money we put into association work does appear on your books as expense because the accountants don't know how else to show it. Actually it is money well invested. Industries that had the best associations proved that to be true by coming through 1921 in the best condition. Had we been doing in 1919 the sort of work we are now doing in the association, my own company would have saved several times the total amount spent by all of you on the association. I feel that we can never again risk going it blind, and I know that others feel the same way.

"When I was first elected your president, in 1920, we all felt that we needed better association service than we had been giving ourselves. To-day we have progressed far, but much more remains to be done. Standardization and statistics are the two big things ahead of us. Statistical reports have been valuable to a few groups who have started them. They become more valuable as time goes on. We ought to make our statistical work cover every branch of the industry. That work repays active co-operation of the members in each group. As more groups join in, we can construct that reliable, trustworthy barometer that our manager has been so anxious to give us.

Importance of Standardization

"Our industry has been backward in standardization, but we are now able to report definite progress. The American Engineering Standards Committee has invited us to accept joint sponsorship with the American Society of Mechanical Engineers on the project of standardization of small tools and machine tool elements. The A. S. M. E. appointed its committee, and our general committee is being formed, composed of the chairmen of the various group committees on standardization. I regret that some of our group chairmen have not yet appointed their standardization committees.

"Our customers are demanding standardization. Only recently a builder of a certain type of machines was requested to make a certain minor change in his machine that only involved boring a hole to one dimension, rather than the dimension used by the builder. The user had over $5,000 worth of equipment which he was using on a machine of another make, which would have been useless unless the hole were bored to the proper dimensions on the machine he was then buying. Standardization of one hole saved $5,000 to that customer.

"In England the Machine Tool Builders' Association has arrived at a standard for milling machine spindles, so that in the future every milling machine built in England will be able to use the same face mills, arbors, etc., that are used on every other English milling machine. It is understood that the English standard is based on some American practice.

"If men think that there is not much to standardize, let them think only of those two instances and they will surely recognize that we are lax in our attitude, if we do not actively engage in this sort of work. Not only will we be lax in our attitude, but we shall lose money by losing orders, unless we enter into it."

Report of General Manager DuBrul

Ernest F. DuBrul, general manager of the association, covered many interesting subjects of value to machine-tool builders in his annual report, which in part was as follows:

"From the figures we have, it is safe to judge that since the month of July, the shipments and orders of machine tools have been gradually increasing. The increase is slow, but it is encouraging to note that there is an increase. It would probably be imprudent for machine tool builders to count on a very fast increase. Just now optimism is spreading through the country, and yet this optimism may be premature for the machine tool trade. There are many conditions operative in the business world that make a swift recovery extremely improbable, and only if it is slow will it be a sound recovery.

"One encouraging thing is that more and more members of this association are giving serious study to the necessary cycles in which this industry is bound to run, and are basing their policies for the future on that study. Some of our members have learned the hard lesson that it costs too much to depend on blind guesswork and mere hunch playing in laying out their business policies. Every week the office gets a number of letters asking very keen questions in connection with different cyclical phases of the machine tool business. These questions show that some of our members are giving serious study to the fundamental factors and conditions of business in general, as these affect the machine tool business.

Remarkable Changes

"The last two years have seen some remarkable changes in the business policy of large concerns. Banks, merchandising, and manufacturing concerns have seen the wisdom of employing economists as a part of their organization. The modern development of trade associations is along the very same lines. Only if operated according to economic and statute law can any trade association survive.

"As a result of this depression, the business world is getting to realize that statistics are not merely a lot of dry figures that have no interest to anyone but a delver in the past. More and more large business organizations and trade associations are spending money on statistical work that will be a guide to their future policies. The profession of consulting economist is growing in the estimation of business men. Just as they consult engineers on many questions, they now call for interpretation and correlation of economic facts. More and more, as time goes on, will statistical compilations be taken by business men to consulting economists for individual, private interpretation.

Amortization Claims

"In the revenue law of 1921 there is a provision limiting the time during which amortization claims may be filed to March 15, 1922. Probably every member is entitled to some amortization deduction—many of the members overlooked this source of relief from excessive taxation. Every dollar recovered will be a larger dollar than it was when paid. The dollars paid in were small dollars as measured by the amount of product sold at the high prices and large volume of 1918. The same dollar, if gotten back now, has a larger purchasing power, and it would take considerably more production, sold with more effort, at to-day's lower prices, with a smaller margin of profit, to get an equivalent purchasing power back into the manufacturer's cash account.

"It is safe and conservative to say that the total amount of claims that will be presented and allowed, as a result of the association's interest in the matter,

will far exceed the total cost of the association for the past 20 years, and for the coming 10 years. This is a direct money benefit that the association has returned to some members.

Taxation Statistics for 1918

"Members will recall that during our convention last October it was announced that the association would attempt to secure information that might be of benefit to members in prosecuting claims for relief, under Section 207. A questionnaire was prepared and sent to all the members, wtih the invitation to file their figures, based on this questionnaire, and to receive in exchange a compilation which would be of service to the tax accountants of the individual concerns. This questionnaire was answered by 56 members. The information was tabulated and distributed to those who contributed their figures. Several tax consultants, acting for various members, have found this information to be of great assistance in the preparation of individual claims.

"Work of this kind would be impossible without an association to act as a medium for its accomplishment. Several members who reported on this questionnaire had not made any claims for relief, and as the returns came in without identification, it was impossible for the general manager to call the individual attention of some members to the fact that they seemed to have a valid claim. The tabulation showed a wide variance in earnings, compared to invested capital, and a number of claims could be substantiated. The 56 reports are fairly typical of the total membership, and we think there are quite a number of unsuspected claims among our members that ought to be given attention under the relief section, in addition to claims under the amortization section.

Cost Work

"It was unfortunate, both for the members and for Scovell, Wellington & Co., our consulting accountants, that the industrial depression discouraged the cost work begun last year, and carried to the point of establishing a set of uniform principles, on which members are recommended to base their cost finding systems. It is very desirable that those who can possibly afford it, revamp their cost systems to put them in accord with these principles. This is the very best time to make changes in methods. If members wait until faced with a rush of business, they will be unable to do good revision work on cost systems. It is best done when the organization is able to give the question proper thought.

Improvement of Our Own Statistics

"As stated at the October meeting, it is perfectly possible for this association to construct a first class business barometer for the industry. The sole requisite is that the members furnish the information.

"In an attempt to secure this information, your general manager sent out a bulletin in December, with a form, and asked for comments. Very little response was obtained. The general manager feels that it is a mistake for the industry not to get this information together. The compilation is not difficult. The proposed barometer report merely deals with orders and shipments; it does not deal with production and stocks, as do the various group reports that we are getting regularly and faithfully from the shaper, upright drill, and radial drill groups.

"To get a really worth while barometer, we should classify orders and shipments in groups covering all classes of machines according to their prices.

"About 100 members faithfully contribute to our present barometer, but it is deceptive, because it is based on the high prices ruling in the first quarter of 1920. Price reductions since that time make it impossible to judge the unit movement now going on, compared with the first quarter of 1920. Then, too, the present curve is merely an average of various percentages that have no common base. Large and small machines are all lumped together. It would be much more worth while to note the movement of the different price classes, and be able to tell what is really going on. It would take very little work in the offices of the members to classify orders and shipments according to the price classes mentioned.

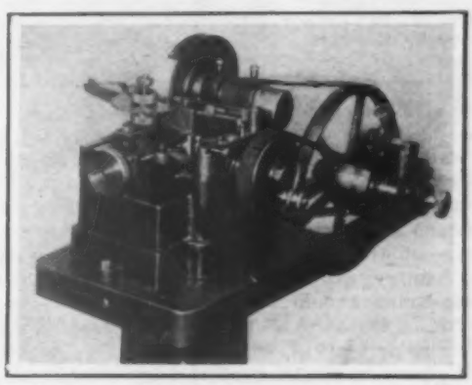
"It appears reasonably certain that in the past, demand for small machines has revived before demand for large ones; and that conversely, demand for large machines fell off before orders for smaller machines went off. If we could get these data from the membership and put them together, many a manager could be helped in laying his plans for future production. At present he can only guess—and that means being wrong most of the time."

Machine for Conditioning Small Saws

A No. 2 automatic saw sharpener for sharpening and reclaiming slotting cutters, slitting and other saws from 1½ to 8 in. in diameter and up to 5/32 in. thick has been added to the line offered by George Scherr, 126 Liberty Street, New York.

The machine provides a means for reclaiming small saws and cutters ordinarily discarded because of the expense involved in sharpening by hand. In this connection it is pointed out by the maker that in several instances the machine has reclaimed from the scrap pile enough saws and cutters to pay for the investment.

As shown in the illustration the machine is entirely



Machine for Sharpening and Reclaiming Small Saws

self-contained and is mounted on a cast-iron column. The construction is similar to the No. 1 machine but provides increased capacity. The grinding wheels are 4½ by ⅜ by ½ in., and the grinding spindle is equipped with taper bearings, adjustable for wear. Indexing is done by means of the saw to be sharpened, differences in the distance from tooth to tooth presenting no difficulty. The machine will feed saws with one or more teeth broken out, proper adjustment for feeding such saws being provided. Operation is simple and adjustments for different sizes and kinds of saws easily made.

Saws with hole for ⅜ to 1 in., and distance from tooth to tooth up to ⅜ in. can be handled. The measurements given are 12 by 24 by 36 in., the column being 30 in. high. The gross weight is 165 lb.

Increased operation of the Steelton, Pa., plant of the Bethlehem Steel Co. to about a 70 per cent basis to take care of orders has been announced by plant officials. Blast furnace, "B," which has been idle for a year, is being repaired and will be put in operation within a few days. Only one furnace has been in operation recently, and the plant under the new order will be working nearer to capacity than it has done at any time during the last year.

Barton R. Shover, consulting engineer, Pittsburgh, was the speaker at the bimonthly meeting of the steel works section, Engineers Society of Western Pennsylvania, at the William Penn Hotel, Pittsburgh, Tuesday evening, April 25. Mr. Shover's talk was on the manufacture of steel in India, a subject with which he is very familiar by reason of the fact that he was actively connected with steel plant construction in that country.

THE FARMER AS A STEEL USER

Congressional Commission Gives Incorrect Statistics of Agricultural Consumption

WASHINGTON, April 25.—Making a report on the economic relationship of transportation to agriculture and industry, the Joint Commission on Agricultural Inquiry, in its forthcoming report, arrives at the conclusion that, figured in terms of transportation, the farmer is suffering from a 72-cent dollar. Speaking for the entire commission, Chairman Anderson of Minnesota gave out an authoritative forecast of the section of the report on transportation to be published early in May dealing with this branch of the subject.

"The Joint Commission has decided to report to Congress," said Chairman Anderson, "that the transportation rates on many commodities, more especially the products of agriculture, bear a disproportionate relation to the price of such commodities; that immediate reductions in transportation rates should be first applied to farm products and other basic commodities; that reductions in rates upon the articles of higher value, or upon tonnage moving upon so-called 'class rates,' are not warranted while the rates upon agricultural products and other basic commodities remain at their existing levels; that greater consideration should be given in the future, by public rate-making authorities and by the railroads in the making of transportation rates, to the relative value of commodities and existing and prospective economic conditions.

"It also appears from our inquiry that the pyramided per cent advances in rates authorized by the Interstate Commerce Commission or made by the United States Railroad Administration cause the dislocation of long standing rate relationships between rates upon agricultural and industrial products and between competitive enterprises and competitive sections of the country; also, that the railroads and public rate-making bodies should seek to readjust rates so as to preserve as far as practicable the general relationship existing prior to 1918, with due regard to present and future economic conditions."

At some length the summary of the report sets forth what it conceives to be the position of the farmer, and as an instance says that in October, 1921, farm products were at an index figure of 102 and railroad rates at 169, and that in this period of falling prices for farm products, the increased freight charges made the farmer feel more keenly the relationship of freight charges to the price obtained for his product.

A perusal of the summary necessarily confirms the well-known fact that the farmer had suffered an undue deflation, but at the same time the idea cannot be escaped that the report is misleading in its prejudiced and strongly sympathetic attitude toward agricultural interests as compared with manufacturing interests. It is a well-known fact that iron and steel also have had to undergo a severe deflation in the face of high cost of production, due largely to excessive freight rates, and that as a matter of fact, index figures for February and March of this year show that iron and steel prices were more greatly deflated than were prices of farm products, which have shown a degree of recovery. The report of the Bureau of Labor Statistics, Department of Labor, shows that in February and March of the present year the index figures of metals and metal products were 115 and 114 respectively, as compared with index figures of 126 and 128 for farm products.

Comparing prices in March with those of a year ago, as measured by changes in the index figures, it is seen that farm products alone average higher, the increase in this group being 3 per cent. In all other groups, prices were lower than in the corresponding month of last year, ranging from 5 per cent in the case of cloths and clothing, to 22½ per cent in the case of house furnishing goods. A remarkable statement in the summary is to the effect that "the farmers are the second largest consumers of steel, coming next to railroads, and purchase annually about 30 per cent of the country's steel production." There is no indication as to how the commission arrived at this interesting estimate. As is known to the trade, there are no adequate statistics denoting the quantity of steel consumed by agriculture, but manifestly the percentage given is greatly overestimated. The general opinion of the well-informed is that the steel used by agriculture in farm implements, wire, nails and vehicles, including automobiles, does not exceed 5 to 10 per cent of the steel output. Obviously, according to the commission's construction, the carriers would have to consume more than 30 per cent, which also is not the fact. These two totals when put together exceed 60 per cent, so that all the remaining great sources of consumption would represent less than 40 per cent of the country's steel output.

The vast importance of the farmer to the community and his high rank as a consumer of many commodities, including steel, to say nothing of his important position as a producer, is sufficiently impressive without an attempt to stress his standing unduly. The report correctly says that the farmers are intimately interested in the relationship of transportation cost to the sales price of steel. It adds that "the freight element in a ton of steel is declared by iron and steel makers to be in excess of 41 per cent of the selling price of the finished article, and still higher in the case of pig iron."

British Recovering from Slump

WASHINGTON, April 25.—Trade recovery of Great Britain, as reflected in returns for March that have been cabled to the Department of Commerce by Commercial Attaché Tower, at London, indicate that the heavy slump that began in January is already a thing of the past. Exports were the heaviest in 12 months, the market for raw materials being especially strong. The balance of trade, practically even in February, shows for March an import excess of £15,000,000, a little below the monthly average for 1921. The recovery of British trade includes a remarkable increase in iron and steel exports, which amounted to 296,000 tons in March, valued at £5,771,000, as compared with 150,000 tons in March of last year, valued at £6,531,000, and 224,000 tons in February, valued at £4,687,000.

Perhaps as remarkable as is the increase in exports is the decided deflation in prices, and no doubt the two have a direct connection. But the increase in the value of the pound sterling is also to be considered. The figures show that steel tonnage exports in March were 197 per cent of that of a year ago, but represented, in pounds sterling, only 91 per cent of the former valuation. In view of this wide difference in prices, there is a question as to whether or not British steel manufacturers, in order to regain foreign markets, are not actually selling at less than cost of production.

Mr. Tower reports that the United Kingdom imported 63,800 long tons of iron and steel during March, and exported 298,500 tons, consisting chiefly of:

Articles	Imports *Tons*	Exports *Tons*
Pig iron and ferroalloys	9,700	*44,400
Ingots, blooms, billets, slabs, etc	15,000	600
Iron bars, rods, angles, etc	5,900	1,500
Steel bars, rods, angles, etc	7,500	16,300
Structural steel	1,500	5,900
Hoops and strips	2,200	3,300
Plates and sheets	3,300	27,300
Cast tubes, pipes and fittings	1,000	4,300
Wrought tubes, pipes and fittings	2,200	6,600
Rails	1,100	41,100
Wire	4,100	2,600
Wire nails, including staples	3,900	100
Nails, tacks, rivets and washers	400	1,000
Bolts and nuts, including screws for metal	300	900
Galvanized sheets	....	49,900
Tin plate	....	38,800

*11.39 per cent of the 389,800-ton output for March. The exports of finished and semi-finished products, 254,100 tons, represent 46.25 per cent of the total tonnage of steel ingots and castings produced. On the usual 78-per cent ratio between ingots and finished steel, exports were 59.3 per cent of production.

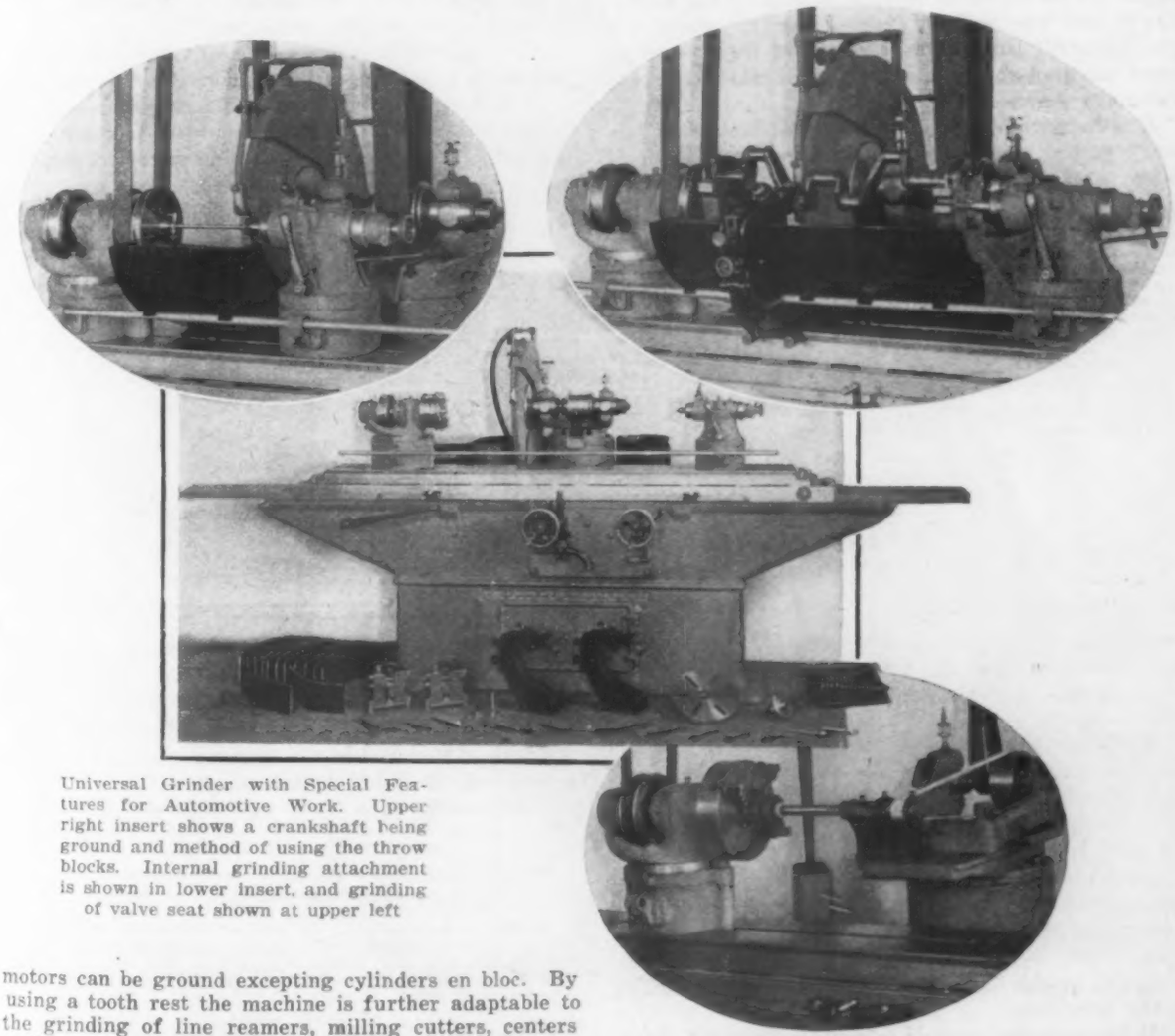
The Treasury Department, Bureau of Engraving and Printing, Washington, will take bids until 2 p. m. May 15, for a quantity of brass and iron castings, in connection with an assortment of miscellaneous equipment and supplies. Louis A. Hill is director.

BROWN & SHARPE GRINDER

Regular No. 4 Universal Machine with Special Features for Crankshaft and Other Automotive Grinding

The Brown & Sharpe Mfg. Co., Providence, has added to its line the No. 4 universal and crankshaft grinding machine shown in the accompanying illustrations for use principally in service shops on automotive parts.

The machine is adaptable to a large variety of work, grinding crankshafts, pistons, wrist pins, valve seats and stems, etc., in addition to the regular straight and taper grinding of a universal machine. With an internal attachment and chuck the machine does internal and face grinding; in fact, all ordinary parts of motors can be ground excepting cylinders en bloc. By using a tooth rest the machine is further adaptable to the grinding of line reamers, milling cutters, centers and other tools.



Universal Grinder with Special Features for Automotive Work. Upper right insert shows a crankshaft being ground and method of using the throw blocks. Internal grinding attachment is shown in lower insert, and grinding of valve seat shown at upper left

It is to be noted that aside from a few special features necessary to accomplish its particular purpose the construction of this machine is similar in all details to the company's regular No. 4 universal grinding machine. It can be easily converted into the regular machine by removing the raising blocks from under the headstock and footstock, changing the size of the grinding wheel and its guard and making slight additions to the equipment. This is emphasized by the makers, who offer the machine not as an experiment but as a timely adaptation of a type of grinding machine that has found wide favor.

In grinding crankshafts the careful construction of the throw blocks is of primary importance and accordingly in this machine the throw blocks are made with tool-room accuracy. The sides are finished to an exact size in relation to the center holes in the sliding blocks which permits the crankshaft to be readily alined by placing the blocks on their sides upon a surface plate. Other features of the blocks are the adjustable clamp caps which provide for various diameters of shafts, the three center holes for crankshafts of different throws, the adjustable slide for obtaining a finer adjustment and the special extension of the slide block used on the headstock end of the crankshaft. This extension, with its recess, provides for grinding flanged crankshafts.

Another feature is the piston arbor which is designed for the greatest convenience in mounting pistons. In addition to the piston being mounted on dead centers, it is also ground upon its own centers, which not only assures accuracy but trues up a seasoned piston concentric with the same axis upon which it was first turned. There being no three point bearings to establish, the tendency for the piston to cramp or become off center is eliminated.

In valve grinding the wheel slide is set at the desired angle and the corner of the wheel moved across the valve seat. After the wheel slide is set the table remains stationary and the cross feed traverses the wheel across the face of the valve seat.

The centers swing 20¾ in. in diameter, 15½ in. over the water guards and take 60 in. in length. The spindle and boxes can be easily removed to make room for the internal grinding attachment. The automatic cross feed will move the wheel from 0.00025 to 0.004 in. at each reversal of the table, as desired, and is automatically disengaged when the work is to size. The table travel is automatic and is controlled by adjustable dogs. Speeds and feeds of the wheel and work and table feed are independent of each other. A single lever starts and stops the rotation of the work and the feed of the table. The table reversing mechanism is very accurate permitting work to be ground close to the shoulder.

The grinding wheel is 24 by 1 in., and has a 5-in.

hole. The footstock carries the holder for the carbon point, and the wheel can be trued without removing the work from the centers. Two universal back rests for supporting slender work or splined shafts are included, and are universal in all movements and capable of delicate adjustments, automatically compensating for decrease in diameter as the work approaches size. Their use is shown in the illustration of the method of grinding a crankshaft.

For wet grinding a tank and pump are attached to the rear of the machine. Suitable water guards protect the operator from the spray. The floor space required is 52 in. at right angles to the spindle and 207 in. parallel to the spindle.

Power Required to Roll Wrought Iron Bars

Results of Tests in Reducing 3-In. Billets to ½-In. Rounds

BY EDWIN L. FLETCHER*

MANY volumes of data, and charts without number, have been compiled in relation to power consumption in the operation of merchant mills. This knowledge is and has been in general use throughout the steel industry; but a definite record of the amount of power required to operate the individual pass is exceptionally scarce.

However, while this great array of steel data has been compiled, and by reliable authors, the manipulation of wrought iron has been somewhat neglected, and many mill superintendents have found, to their sorrow, that figures required for present day steel operation, when applied to wrought iron, have brought all to grief.

Mills built a generation ago are now showing their age, and have to be handled with care, to prevent overloading of the powerplant driving them, with consequent damage and delays caused by breakdowns. If the mill foreman, when laying out his passes and orders for rolling, is careful to watch out for the percentage reduction, taking into consideration power requirements, it is likely that he will find many cases where it will be better judgment to wait a few seconds at certain passes, so that all stands will not be working at the same time.

It has been the writer's experience that mill superintendents and foremen, and rollers paid on a tonnage basis, often are on bad terms with the master mechanic, and blame him for every breakdown, rather than working in harmony with this partner in the business. The roughing mill "sticker" is another bad actor, as a rule, who thinks that, by crowding the merchant mill crew with work, an increased production is to be had.

The heat loss between the roughing mill and the merchant mill is a great deal more serious in rolling wrought iron than in rolling steel, and proper timing at this point may cut the scrap loss in half.

Old time mill operators considered that from 75 to 100 lb. billets were the proper weights of metal to handle, when rolling 3-in. billets down to ½-in. bars. They governed the distance between roughing and merchant mill accordingly, and set the spacing as 26 ft. centers. But competition has demanded increased production, and it is well to increase this distance to 32 ft., and roll billets of from 100 to 135 lb.

The speed of the mill materially affects the quality of the product and the percentage of scrap loss. In modernizing the old mills, electrically-driven equipment requires a knowledge of the amount of power consumed at each stand for work done in reducing the section.

While the following tabulation does not contain so much information as some engineers might ask for, it is a fair average of power consumed, over a number of days of rolling of the product of eight puddling furnaces for wrought iron bars, to meet the requirements of railroad shops and chain makers. The only information at hand for the purpose of comparison of strength of material in this tabulation is the following record test of ⅜-in. chain made from the rollings of the same metal upon which this table was founded.

Horsepower used	9 Hp.		16 Hp.		23 Hp.		23 Hp.							Original Stock
Shape of metal passing through rolls	Round	Oval	Sq.	Oval	Sq.	Oval	Sq.	Square	Square	Square	Square	Sq.	Sq.	3-in. square puddled mill product wrought iron
Size of metal passing through rolls	½	⅝x⅞	⅞	1⅛x½	¾	1⅜x⅝	1	1⅛	1⅜	1½	1¾	2	2⅛	
Area in square inches	0.196		0.32		0.563		1	1.34	1.77	2.25	3.06	4	5.06	8.3
Reduction in square inches between passes		0.12		0.24		0.44	0.34	0.33	0.48	0.81	0.94	1.06	3.24	
Per cent reduction, actually rolled		37.6		42.8		44.0	25.4	18.5	21.2	26.9	23.4	21.2	39.2	

Work done for reductions, merchant mill—average, 71 hp.; maximum recorded, 79 hp.
Work done for reductions, roughing mill—average, 82.5 hp.; maximum recorded, 110 hp.
Engine and mill friction..... 119 hp.; maximum recorded, 119 hp.

272.5 hp.

Highest record reached..... 275 hp. Total..... 308 hp.*

*This maximum total was not reached, as the separate maxima did not all come at once.

Tensile Test Report

Welded chain link made up of ⅜-in. hot-rolled rod:
Yield point, approximately..... 5,000 lb.
Maximum strength..... 8,830 lb.

Failed at bearing point on one end across the weld, giving a silky, fibrous fracture. There was no appreciable elongation on straight sides; outside length of link increased from 2.74 in. to 3.00 in. by collapse of the link around the ¾-in. round pulling loops.

The first five passes were through a 12-in. mill at 145 r.p.m. The merchant mill five stands of 8-in. rolls ran at 280 r.p.m. A speed of 300 to 340 r.p.m. maximum would have been desirable if the power equipment had permitted. Beyond this speed the quality of the wrought iron was affected, and acceptable product was questionable.

The merchant mill was belted with a 30-in. triple belt to the roughing mill, which was on direct drive from the engine; pulley sizes 133 in. to 68 in. on 32 ft. centers. The engine cylinder was of 22⅛ in. bore, 26 in. stroke, steam pressure at throttle 110 lb. per sq. in. The engine exhausted through a feed water heater to the atmosphere.

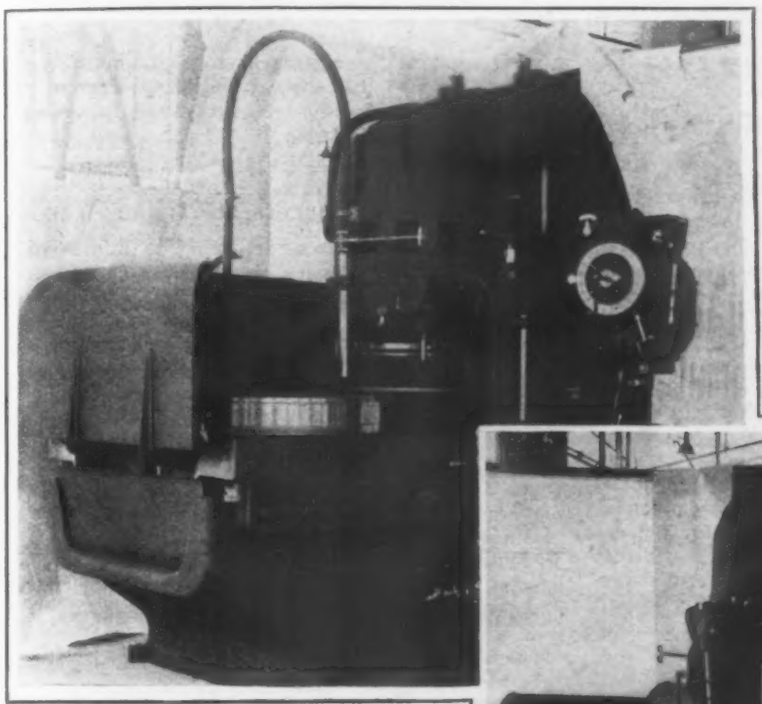
It would be found of advantage to add two electrically-driven stands where ⅜-in. rod is a large part of the mill product. In fact, in many of the old mills now operating by steam engines, individual motor driven stands with a 20 per cent variable speed, from ¾ in. squares on, would no doubt soon repay the cost.

*President Fletcher-Thompson, Inc., Bridgeport, Conn.

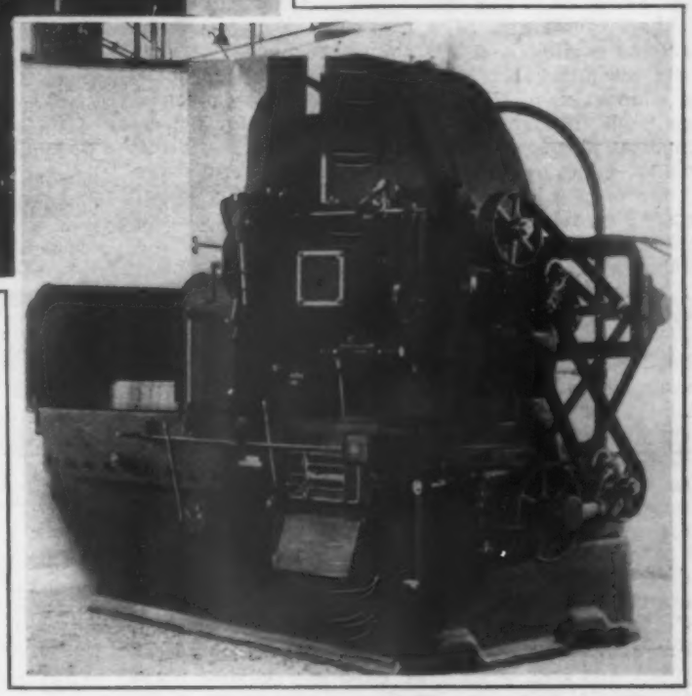
LARGE SURFACE GRINDER

Heavy and Powerful Machine for Work 48 in. in Diameter, 16 and 20 in. High

A vertical surface grinder, believed to be one of the heaviest and most powerful machines of its kind ever built, has been placed on the market by the Blanchard Machine Co., Cambridge, Mass. It is designated as the No. 27-R Blanchard high power vertical surface grinder and is 12½ by 7½ ft. overall, 10 ft. high, and weighs 30,000 lb. Equipped with a standard 42-in. chuck, the vertical capacity is 20 in., and with a 48-in. chuck, as shown in the accompanying illustrations, 16 in.



The Work Is Carried on a Rotary Magnetic Chuck. The vertical capacity is 20 in. with a 42-in. chuck and 16 in. with a 48-in. chuck. Both chuck and table are traversed by power



The Wheel Head Has Built Into It a 60-Hp. Motor and Is Mounted to Slide Vertically on the Column. Both hand and power feeds are through the box on the front side of the column

The work is carried on a rotary magnetic chuck having a speed range of 3, 5, 8 and 13 r.p.m. The chuck is moved horizontally from the loading to the grinding positions, and in the latter is rotated continuously while the wheel is gradually fed down. The wheel has a speed of 600 r.p.m., or better than 4200 ft. per min. Because of size and weight, the chuck and table are traversed by power. Otherwise the new machine in general arrangement is similar to the company's No. 16 grinder and operates in the same manner, although the mechanism is in some particulars different.

The grinding wheel is 27 in. in diameter and 7 in. deep, with a rim either 2 in. or 3 in. wide. It is sulphur mounted in a cast iron retaining ring, attached to the face-plate by six screws, and is wire banded. The wheel head weighs 6000 lb., and has built into it a 60-hp. induction motor. The head is mounted to slide vertically on a massive column, the usual Blanchard three-point support being used to fasten the column to the base, permitting the original accuracy of alinement to be maintained. The motor is directly on the wheel spindle, which is 5½ in. in diameter, and is carried on two large radial-thrust ball bearings. A spring take-up at the upper end exerts an upward pull on the spindle exceeding the weight of the rotating parts by 1000 lb. This initial load on the lower or main thrust bearing eliminates all play or backlash. The main bearing has a rated thrust load capacity of more than 25,000 lb.

The vertical motion of the wheel head is controlled by a heavy feed screw, 4½ in. in diameter, carried in ball bearings in the column, the feed screw being driven through a gear box mounted in the column, receiving its power from the upper pulley. Double friction clutches provide for rapid raising and lowering of the wheel head. Both hand and power feeds are through the box on the front side of the column. The power feed has an automatic stop, also a convenient adjustment, giving feeds from 0.0005 in. per revolution of the chuck. The hand feed is 0.10 in. per revolution of the crank. A single lever controls the engagement of the power feed, as well as the raising and lowering clutches, and is arranged so the clutches and feed cannot be simultaneously engaged.

A large pulley, located in the lower portion of the machine, drives the chuck rotation, and to the left of it is located a pulley which drives the water pump and table traverse. The chuck is driven through a four-speed sliding-gear box, with friction clutch for starting and stopping, interlocked with the gear shift. Power for all purposes, except driving the wheel, is supplied by a 5-hp., 1200-r.p.m. motor on the further side of the column.

The rotary magnetic chuck for holding the work is of the Blanchard one-piece steel type. It has closely spaced poles for holding either small or large work, and its face of brass and steel is waterproof. The chuck is carried on a substantial table, sliding on the base of one flat and one V-way. This table spans the base like a bridge and all water and metal from the work fall directly into the first part of the water tank in the base, where most of the solid material settles to the bottom. From here the water overflows into the rear part, under the column, where any remaining material can settle. The water then flows under a

skimmer, which holds back floating dirt, and over another dam into the pump tank.

The first part of the main tank is cleaned from the left end and the second part has a large cleanout opening near the right-hand end on the front. Both parts are arranged so that the entire bottom can be reached with the hoe provided, and an inclined end leading to an overhanging drip edge facilitates removal of the mud into any receptacle. The pump tank is accessible for cleaning, but is said rarely to require it. The total water capacity is 425 gal. The pump has a 10-in. diameter runner, and a 2½-in. discharge pipe.

There is the usual water supply to the inside of the wheel through a 2-in. pipe and to the outside nozzle through a 1½-in. pipe. Waterguards of ⅛-in. steel plate surround the work and wheel. The wheel safety guard is of 5/16-in. steel plate, carried on three heavy steel rods, and has a convenient rack and pinion mechanism for vertical adjustment. A wheel dresser attached to the head provides for dressing or sharpening the face of the wheel while grinding.

Lubrication has been carefully studied. Both main gear boxes have pressure feed to every bearing from submerged gear pumps, and other important units have a reservoir of oil with means to circulate or splash on all bearings. All gearing is of steel and the sliding gears of heat-treated alloy steel. Complete protection against dirt and water has been provided.

COAL INDUSTRY PROBLEMS

Revival of Proposition to Establish Seasonal Freight Rates

WASHINGTON, April 25.—The study being made by Administration agencies with a view to remedying basic difficulties in the coal industry does not, it is believed, include the establishing of seasonal freight rates. Several plans said to be under consideration were outlined in THE IRON AGE last week. These relate to the setting up of a board similar to the Railroad Labor Board, authorization of a common selling agency in each district and the establishing of a sliding scale based on 6-day continuous employment. The idea back of these plans is to remove labor trouble as nearly as possible and to stabilize the industry, which would mean regular operation of the efficient mines and elimination of the inefficient mines. Recommendations made through the Geological Survey for the development of super-power plants to carry current direct from the mines are of course being given careful study, but the proposal is so enormous that obviously it will require a considerable period before it can be adequately worked out, if it is adopted.

Meanwhile, however, the strike in the coal industry has brought about increased discussion, suggesting the renewal of proposed legislation to establish seasonal freight rates on coal. Many objections have been pointed out to this plan and prominent administration officials are understood to consider that it is impractical. One of the interesting arguments made against the plan was that of Vice-President J. D. A. Morrow, of the National Coal Association, in the course of a cross examination he underwent before the Interstate Commerce Commission on Jan. 20 in connection with the general rate investigation. Mr. Morrow had argued for reduced rates on coal. He was questioned by several commissioners as to the feasibility of establishing seasonal coal freight rates.

In brief, Mr. Morrow said that this was a question which would have to be discussed with local conditions in mind, and that no general statement could be made applicable to particular months of the year which would hold good everywhere. He stated that the effect of freight rates seasonally modified in influencing the coal movement had been overrated. It was pointed out that coal is not easy to store and handle; that it deteriorates and that consumers prefer to have it fresh; that preferential rates would not result in mines being more evenly employed and would not produce a better effect on the market and a better distribution of rolling equipment, unless there was a difference between summer and winter rates. Physical and competitive conditions, Mr. Morrow pointed out, would prevent stimulation of storage at points of production.

Commissioner Lewis asked Mr. Morrow what is generally the reason for a runaway market in coal prices, and was told that with one exception in the last 18 years the controlling reason has been an insufficiency of transportation between the mines and the consumers. The single exception to which he referred was the time of the anthracite strike in 1902. In other words, car shortage was assigned as the reason for a runaway market, but Mr. Morrow said that it does not always come at the approach of winter or during the winter. He said that the car shortage in recent years was in the spring and summer of 1920, following the outlaw switchmen's strike.

More Metal Workers at Higher Wages

Iron and steel plants, according to figures of the Bureau of Labor Statistics, show for March a gain over February of 2721 employees in 109 establishments. This gain of 2.3 per cent was accompanied by a gain of 6.7 per cent in amount of payroll and a corresponding gain in the March pay envelope from $42.51 to $44.31, or 4.2 per cent.

In the automobile industry the gain in 49 establishments was 2.2 per cent in number of employees and 7.3 per cent in payroll total. In car building and repairing there was a gain of 4.6 per cent in number of employees in 62 establishments, and a gain of 3.7 per cent in amount of payroll.

Metal workers as a whole, represented by these three groups, show a gain of 7697 employees (2.8 per cent) during the month, accompanied by a gain of 6.2 per cent in total payroll. The average pay envelope advanced from $51.69 to $53.13, but it is still far below the $61.12 of last year.

Wages in car building and repairing, due to the continuance of war time wages in railroad repair shops, are considerably higher than in the steel industry. The excess in March over steel mill wages was 30.7 per cent. Wages in automobile plants were 38.3 per cent over those prevailing in steel plants. Details are shown in the table.

Period	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
February, 1922..	109	117,193	$4,981,029	$42.51
March, 1922.....	109	119,914	5,313,992	44.31
March, 1921.....	113	134,421	8,185,422	60.90
*Automobiles**				
February, 1922..	49	94,196	5,499,013	58.38
March, 1922.....	49	96,269	5,898,046	61.27
March, 1921.....	50	80,679	4,606,728	57.10
Car Building and Repairing				
February, 1922..	62	54,504	3,183,436	58.40
March, 1922.....	62	57,007	3,301,886	57.92
March, 1921.....	62	55,587	3,750,721	67.48
Total Metal Workers				
February, 1922..	220	265,893	13,663,478	51.39
March, 1922.....	220	273,190	14,513,924	53.13
March, 1921.....	225	270,687	16,542,871	61.12

*Payroll figures are reported as "weekly"; they have been made "half-monthly" by multiplying by 2 1/6.

On April 1 there were 23 blast furnaces in operation in Belgium, producing 410 tons of foundry and 3565 tons of basic iron each 24 hours, according to a cablegram received by the Department of Commerce. The increase in blast furnaces under operation from 18 on Feb. 1 to 22 on March 1, and then to 23 at the beginning of April indicates a sustained volume of business which, however, has reacted mainly in favor of the larger plants having better sales organization and production facilities, making possible greater price flexibility.

NEW STAYBOLT EQUIPMENT

Two Machines for Manufacture of Staybolts of Various Classes and Types

Two recent offerings in staybolt equipment are the model B and model A Lassiter-Millholland horizontal staybolt machines shown in the accompanying illustrations, built by the Millholland Machine Co., Indianapolis, and marketed by the Dale Machinery Co., Inc., New York and Chicago.

The model B machine is for turning the taper and straight diameters on radial buttonhead and crown staybolt forgings simultaneously and for threading both taper and straight surfaces in uniform pitch and continuous lead, also simultaneously. The turning and threading operations are done separately, but both can be done on the same machine by replacing cutters for chasers.

For turning the bolt is gripped in a special collet having an adjustable stop. The turning feed is then engaged through a friction in the apron and two turning heads on the slide are fed over the portion of the bolt to be finished, turning both ends simultaneously. These heads are special "Modern" die heads having solid cutters for turning which may be replaced with chasers for threading. The cutters and head really operate as a hollow mill, one of the most accurate methods of turning metal to size. The front head has a taper attachment which gives its cutters a slight opening movement as it feeds forward. The cutters in the rear head are straight. Both heads are opened automatically at the correct instant and closed by adjustable cams on a slotted bar.

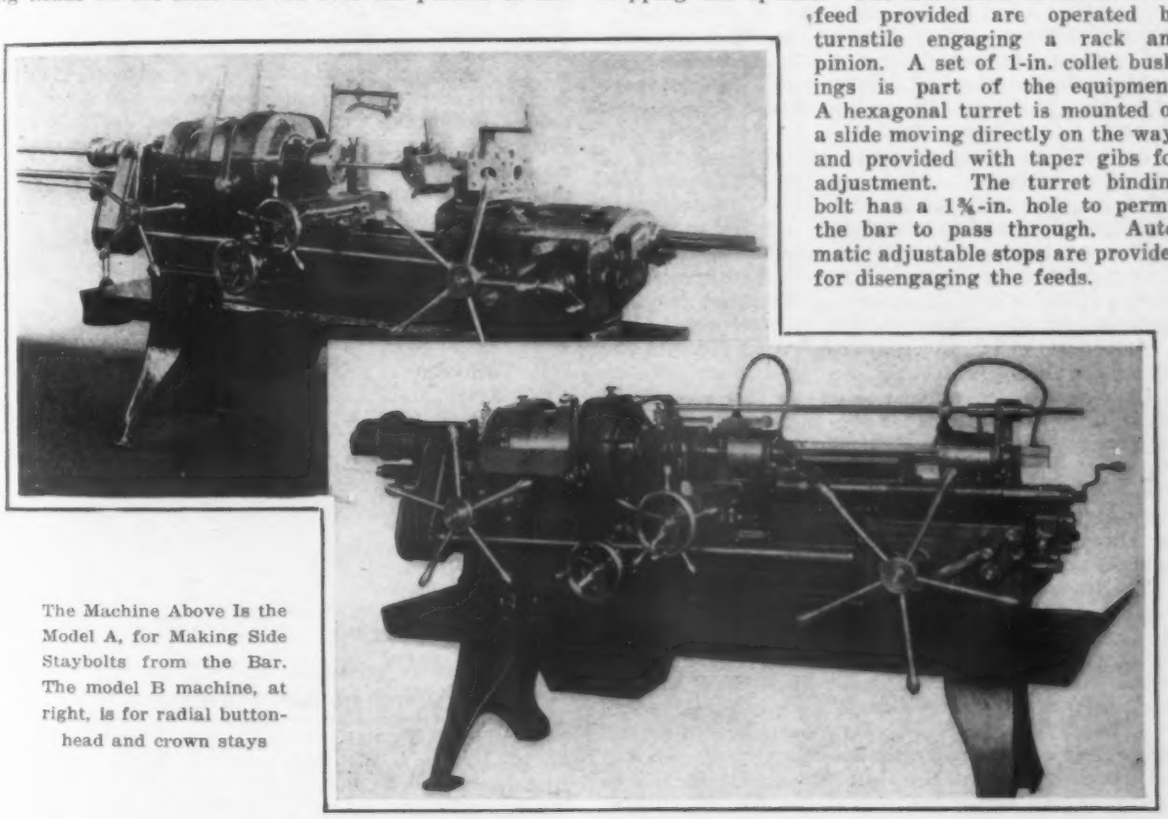
For threading, the cutters in both heads are replaced with chasers. The heads are held in a constant relation on the slide, which is fed forward by a nut and lead screw in the apron. This arrangement is intended to result in a bolt with threads on both taper and straight ends perfectly concentric and in continuous lead and uniform pitch.

The rear die carrier is adjustable on the slide by means of a fine pitch screw and may be set for bolts from 14 to 36 in. long. A V-block on the slide is intended to prevent the bolt from dragging in the chasers when the die heads open. A permanent spacer bar, accurately made, is provided for setting the die heads in continuous lead when changing for length. A cross slide with hand cross feed, hand longitudinal adjustment and front and rear tool posts is provided for forming the button heads and necking the bolts.

The capacity of the machine is given as ¾ to 1½ in. diameter by 14 to 36 in. long. The length of slide is 34 in., the turning length being 5 in. The approximate floor space occupied is 2 ft. 8 in. by 8 ft. and the net weight 3500 lb. As an example of the production it is said that 700 tapered radial staybolts, 28 in. long, were machined by one operator in 9 hr.

The model A machine is designed to make side staybolts from the bar, either copper or iron, turn the relief in the center and thread both ends in uniform pitch and continuous lead. It is a rigid, well-proportioned machine with special feed box, the lead screw and apron being of a special design intended to prevent lagging or creeping of the die head when threading.

The headstock spindle is equipped with a three-step cone pulley and double friction back gear, giving nine spindle speeds. A geared-head machine is also built. Speed changes are made through frictions without stopping the spindle. The automatic chuck and bar feed provided are operated by turnstile engaging a rack and pinion. A set of 1-in. collet bushings is part of the equipment. A hexagonal turret is mounted on a slide moving directly on the ways and provided with taper gibs for adjustment. The turret binding bolt has a 1¾-in. hole to permit the bar to pass through. Automatic adjustable stops are provided for disengaging the feeds.



The Machine Above Is the Model A, for Making Side Staybolts from the Bar. The model B machine, at right, is for radial buttonhead and crown stays

A double-plate apron is attached to the slide and is driven from the feed box by a splined lead screw. Two half nuts are engaged with the lead screw for threading, and bevel gears driven by the spline through a friction are used for turning the relief. These feeds are automatically disengaged at the desired points, and are so interlocked as to be engaged separately.

For relieving the middle portion of the bolt, a single cutter roller box mill of special design is provided. For threading, a "Modern" automatic self-opening die head is controlled by the lead screw in a manner intended to produce accurate threads of uniform pitch and continuous lead on both ends of the bolt. The half nuts are engaged until both threads are completed. The spindle is speeded up by friction while the head travels over the relieved portion. Staybolt threads of 8 through 12 per in. and 2, 2½ and 3 mm. pitch may be cut by varying the change gears in the feed box. The cross slide has hand cross feed for necking and cutting off, and hand longitudinal adjustment for locating. The spindle capacity, regularly 1⅝ in., can be increased to 2¼ in. The length that can be turned is 12 in. The approximate floor space is 2 ft. 8 in. by 8 ft., and the net weight 3000 lb.

SUBSTITUTES FOR COAL

Mahoning Valley Companies Using Oil and Gas—Prices Advance

YOUNGSTOWN, April 25.—Stoppage of production in coal fields which ordinarily supply the Youngstown district to a large extent has not yet produced appreciable contraction in operating schedules. The Brier Hill Steel Co. is preparing to place a second blast furnace in action during the week, having covered on its additional coal requirements in the West Virginia and Kentucky fields. To conserve coal supply, substitutes are being employed with satisfactory results by Valley plants, particularly fuel oil, which is being purchased in large quantities by one interest. Another independent is arranging to use natural gas to heat its open-hearth furnaces.

With consumers urging deliveries, prices are naturally trending toward higher levels. Blue-annealed sheets have been sold at 2.60c., an advance from the nominal market of 2.40c., while one independent has been quoting 3.50c. on new tonnages of black sheets. This represents a markup from 3c., at which considerable business was booked prior to the last formal price advance effective April 1. Independent interests are not inclined to obligate themselves beyond present commitments to any large extent.

At least one independent is quoting sheet bars at $35, which compares with a price of $31 which prevailed prior to the coal miners' strike. Shortage of semi-finished material is exerting a more important bearing on the market and is expected to cause a slowing down in production of some non-integrated interests. Makers usually supplying their own requirements have been affected by lack of steel supply and a number of Valley independents have gone into the market for steel.

Open-hearth steel production was further accelerated this week by the addition of two units at the plant of the Youngstown Sheet & Tube Co., bringing such output to the highest average level in the Valley since 1920. Only 8 of 66 open-hearth furnaces in this territory are idle, and in normal times a certain number are always cold for relining or repairs. The independents are operating 44 of their 51 open-hearth units.

The Republic company has strengthened its productive capacity to 55 per cent, adding additional bar mills and a skelp mill. Active sheet capacity is at 84 per cent. The fuel situation has adversely affected production at the Girard works of the A. M. Byers Co., Pittsburgh, where only 30 puddle mills and a skelp mill are active. Hitherto the company has operated its full complement of 88 puddle mills. Scarcity of pig iron and inability to start its blast furnace at Girard on account of the strike are responsible for the curtailment.

No. 5 blast furnace in the Ohio Works group of the Carnegie Steel Co. has resumed, following a short suspension for repairs.

Little merchant iron is available in the Valley and prices are uncertain, one district producer maintaining that they are rapidly heading toward a $25 minimum. A large tonnage of basic iron, estimated in excess of 25,000 tons, which has lain on the grounds of the Brier Hill company for considerably over a year, is attracting the attention of operators.

Tin plate and strip steel are feeling benefits of the current situation. Premiums are being offered, in fact, for delivery concessions on strip above the current levels of 2c. for hot-rolled and 3.65c. for cold strip. Tin plate interests are largely engaged on business entered several months ago at $4.60. Makers say they would not consider new tonnage at this time under $4.75.

Buyers from the Detroit district, representing automobile interests in particular, have been visiting the mills the past week to ascertain what effect the strike has had on production. Due to enlarged production, the Ford Motor Co. is in the market for sheets and strip steel.

While mills are able to buy coal on the market, they are compelled to pay higher prices and additional freight charges. Owing to shortage of pig iron, scrap metal is still in firm demand for melting, and prices are holding firm.

Improvement in Pennsylvania

HARRISBURG, PA., April 24.—Metal and machinery lines in Pennsylvania showed improvement in virtually every district of the state during the first half of April, according to the semi-monthly report of Clifford B. Connelley, commissioner of the Pennsylvania Department of Labor and Industry. The report shows, however, that there are 68,800 idle in these industries in the State with Philadelphia far in the lead with 45,000.

The total number of unemployed in the State, exclusive of miners, showed a reduction during the half-month period of approximately 30,000. On April 1 278,850 were reported out of work as compared to 248,560 on April 15. This is exclusive of miners on strike of whom 289,698 are reported to be idle.

The Harrisburg district reports a pronounced improvement in the metal and machinery industries. Erie reports that the first two weeks has brought the greatest improvements in local industries, which are expected to continue, dependent of course on the outcome of the coal strike. Altoona reports daily improvement. Philadelphia reports that virtually all metal and machinery trades, except the machine shop trades, are improved. Pittsburgh, reports no unusual demands, but says conditions are improving. Scranton finds that iron and steel plants have been adversely affected by the closing of mines, and that at least 1000 more men have been thrown out of work during the two weeks. This is in addition to 3000 men, including machinists, molders, and freight handlers who are on strike.

The unemployed in the metal and machinery trades, by districts, follow:

Altoona	600
Erie	5,000
Johnstown	3,500
McKeesport	1,400
New Kensington	900
Philadelphia	45,000
Harrisburg	2,500
Pittsburgh	6,000
Scranton	3,500
Williamsport	400
Total	68,800

A New Foundry in Uruguay

The first foundry in the South American republic of Uruguay has been started, says the London *Ironmonger*. It belongs to the hardware and engineering firm of Silvia y Cia., of Montevideo, which was established in 1904. The foundry consists of a melting furnace of the cupola type, using scrap iron, capable of producing 25 tons of finished castings per day of 8 hr. Up to the present the scrap iron collected in Uruguay has been shipped to Europe. The plant was made in the United States, and the sand used in the molding operations is obtained locally. A number of large castings have been successfully made for use in repairing machinery employed in experimental drilling for oil and minerals, which the Uruguayan Government has undertaken.

Eighteen draftsmen in the service of the A. O. Smith Corporation, Milwaukee, pressed steel automobile frames and forgings, who were brought from Sweden to Milwaukee a year and a half ago to do special designing work, completed the so-called "Americanization" course in the public school extension department and were granted diplomas. The students tendered a banquet to Charles A. Nyberg, their instructor in the Lloyd Street school. When the young men arrived in Milwaukee they were unable to speak a word of English and through the extension course have acquired a good command of the language as well as assimilating habits and customs of American born citizens.

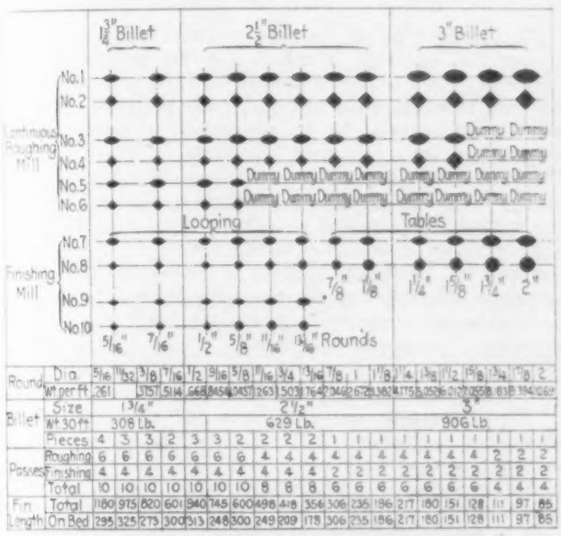
Development of Continuous Rolling Mills

Merchant Mills Not Well Adapted to Continuous Principle —Selection of Cooling-Bed Length— Staggered Mills

BY JOHN W. SHEPERDSON*

VERY few merchant mills can be called continuous, even under the broad definition given earlier in the paper. Under the classification of merchant bar comes all hot-rolled steel that is sold from warehouses direct to the retail trade; it is a finished product and must be accurate in size and section. Consequently, merchant bar must be finished in passes that operate entirely independently of one another, and pure continuous rolling must be limited to the earlier stages of reduction.

While merchant mills cannot be made continuous



Round	Dia.	5/16	11/32	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2
	Wt per ft	.261	.321	.375	.511	.668	.845	1.043	1.263	1.503	1.764	2.044	2.346	2.670	3.013	3.382	4.175	5.050	6.013	7.058	8.181	9.384	10.664
Billet	Size	1¾"				2½"									3"								
	Wt 30 ft	308 Lb.				629 Lb.									906 Lb.								
	Pieces	4	3	3	2	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1
Passes	Roughing	6	6	6	6	6	6	6	4	4	4	4	4	4	4	4	4	4	2	2	2		
	Finishing	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	2	2		
	Total	10	10	10	10	10	10	10	8	8	8	6	6	6	6	6	6	6	4	4	4		
Fin. Length	Total	1180	975	820	601	940	745	600	498	418	356	306	235	186	217	180	151	128	111	97	85		
	On Bed	295	325	273	300	313	248	300	249	209	178	306	235	186	217	180	151	128	111	97	85		

Fig. 12. Preliminary Study for a Continuous Merchant Mill for the Production of Rounds

in the full sense of the term, they may be so designed that they are substantially continuous in principle, in that the material passes but once through each stand of rolls, and the speeds of these stands are related with various degrees of precision for maintaining continuous speed progressions. There are instances of merchant mills where the finishing passes are so arranged that the growth or shrinkage of floor loops is negligible. This has become possible as single engines or motors driving the entire mill have been supplanted by several motors of adjustable-speed characteristics, each driving variously arranged groups of rolls.

The designing of a contemplated merchant-mill installation is almost invariably hampered by the fact that a wider range of sizes is specified than can be secured to best advantage from one mill. This condition is a real handicap, and results in sacrifices which ultimately are found to have been unnecessary, since extreme sizes at both ends of the scale gradually disappear from the rolling schedule as the mill gets into its stride. Continuous merchant mills do remarkable work from the standpoint of economy and tonnage. It is, therefore, a natural consequence that each mill settles down sooner or later to its own economical range of production. This seems to be one of the lessons which experience alone can teach, and the pity is that this cannot more often be made a premise of the original design.

As the total number of passes is fixed by the number of stands in the entire mill, small sections must be rolled from small billets, and large sections from large billets. In this respect, continuous merchant mills differ fundamentally from hand mills. In the latter, since the number of stands bears no fixed relation to the number of passes taken, in that, frequently, several passes are made in the same stand, a widely varying range of sizes may be finished from the same billet section.

Another important reason for using billets of different sizes in continuous merchant mills relates to the matter of keeping the cooling-bed surface filled, while using a billet of uniform length. Uniform billet lengths are essential to good practice in billet yards and heating furnaces. In continuous merchant mills, long sections, accurate from end to end, can be secured. Since the billet length is fixed, whether it be 30 ft. or some other length, change in finished section brings with it change in finished length. This means that, to use the cooling-bed length to best advantage, the cross-section of the billets must be varied with the finished section.

A given area of colling-bed surface has a definite cooling capacity. Bars of larger section finish at higher temperature, and usually have less relative radiating surface to liberate their stored heat. It is, therefore, necessary to roll them in long sections, to give them the advantage of the greatest cooling area on a given bed.

It is, of course, true that, to fill the bed to the same degree with every finished section, there would be required as many billet sizes as finished sizes. As this is manifestly impractical, a compromise must be made.

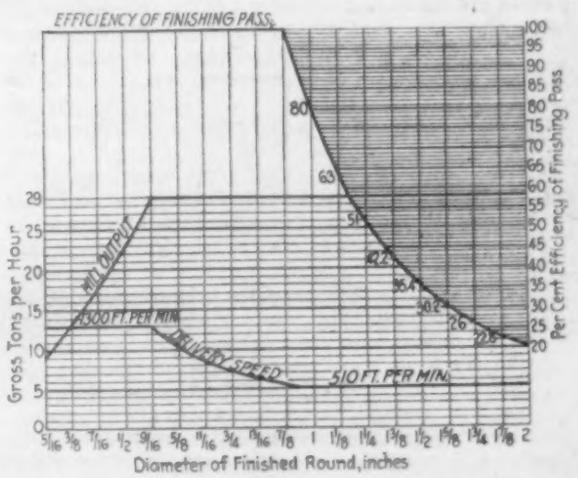


Fig. 13. Production Study Based on the Preliminary Study of Fig. 12

The rolling practice is therefore based on a supply of billets in such progressive sizes as can be conveniently obtained. By a judicious choice of billet section, and the division of the billet into multiples, every finished section can be put upon the bed in a length which will keep the average efficiency of the bed high.

From the foregoing, it is obvious that the selection of a cooling-bed length for a given billet length must be made very carefully. For purposes of illustration, Figs. 12 and 13 show a preliminary study recently made in considering a merchant mill for the production of rounds from 5/16 in. to 2 in. in diameter. This preliminary survey shows the scope of the analysis required to determine the suitable billet sections, the number of

*Engineer, Morgan Construction Co., Worcester, Mass. This paper was read before the Engineers' Society of Western Pennsylvania; this is the third and concluding installment. The first appeared March 23, page 791; the second, April 13, page 993.

multiples into which they should be cut, and the degree to which they will fill the cooling bed. I consider the range aimed at in this study entirely too great for a single mill.

Continuous merchant mills can be classified according to the manner in which the product is manipulated in the finishing mill. By the steel industry, no specific name has been given to merchant mills of different types, but I believe if we call one a "looping merchant mill" and the other a "table merchant mill" we shall not fail to make our meaning clear.

The "looping merchant mill" is obviously a mill of small nominal diameter for rolling smaller sections. It uses 30-ft. billets ranging from 1.5 to 2.25 in., and possibly 2.5 in. square. The division of the total number of passes between the continuous roughing and looping mills permits of a great number of combinations. Each particular grouping is, of course, predicated upon the purpose of the mill. This subject was thoroughly presented by Jerome R. George in a paper on "Merchant Rolling Mills," read before the American Iron and Steel Institute in 1915.

The continuous "table merchant mill" has finishing trains of 12-in. nominal diameter and upwards, and rolls the larger merchant bar. It may have many different groupings of its rolls. One design of mill of the table type recently brought out—which is called the "staggered duo mill," because the roll stands are of two-high construction and are staggered—is illustrated in Figs. 14 and 15.

Fig. 14 shows a George "staggered duo merchant mill," fed by a 30-ft. continuous heating furnace, and a six-stand, 14-in. continuous roughing mill divided into two parts. An auxiliary 8-in. mill is provided, to be used until conditions warrant the installation of a smaller mill, when the undesirable smaller sizes will not be a part of the schedule of this heavy mill. The "skew Y tables" are used only for sizes that cannot be turned in. At all other times the mill is used as a looping mill, and provision is made for the loops to run over and between the tables.

Fig.15 shows a George "staggered duo mill," fed by end-discharge furnaces, and an interrupted continuous 16-in. roughing train. This mill is intended for rounds from 1 to 2.5 in. in diameter, and uses 4-, 5-, and 6-in. square billets in 11-ft. lengths. It also rolls flats and angles of equivalent sizes.

As built in two particular instances, the rolls are of 12-in. nominal diameter; and the mill is intended to roll rounds from ⅞ in. to 2.5 in, and equivalent sections of squares, flats, and angles. One such mill, confining itself entirely to angles up to 3 in., has proved very suitable for this purpose.

A peculiar feature of the staggered duo mill is the short distance between rolls, which the staggered arrangement of the roll stands permits and which, in turn, obviates the necessity for using a broadside transfer. Instead, a special, single table with skew rolls is employed. The end of the table near the rolls is forked, and, because of this, it has become known as a "skew Y table."

The last stand of the roughing rolls of staggered duo mills is connected with the first stand of the finishing mill by a reversing "Y" table, with skew rolls in which the skew determines the position of the bar on the table, making it hug one or the other side according to the direction in which the bar travels.

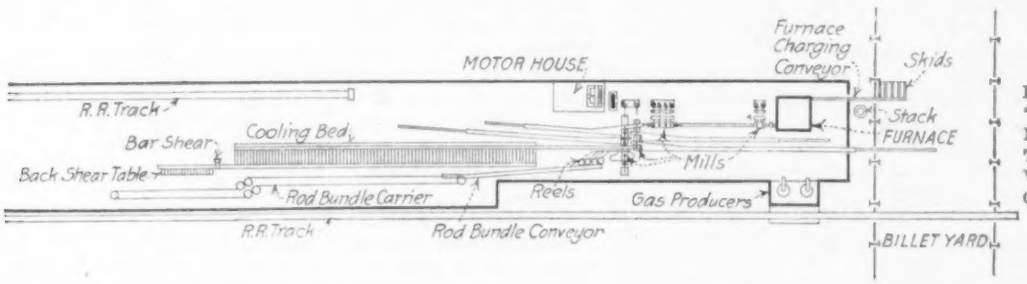


Fig. 14. George "Staggered Duo" Mill with "Skew-Y" Tables for Use When the Product Cannot Be Looped

Thus, when a bar is being received, the table rolls are run forward with the bar, and the bar follows the side guard nearest the delivery pass. After the entire length has been delivered, the table rolls are reversed. This makes the bar move in the opposite direction and, at the same time, move broadside across the table to the opposite side guard, which, in connection with suitable switches, enters it into the next pass. As soon as the mill roll has taken control of the bar, the table may be run in the direction for receiving the next bar. Similar tables of progressively greater length connect the remaining passes of the mill.

Conclusions

Considerations entering into the question of employing a continuous mill resolve themselves into balancing low operating costs and high yield against the initial investment. The initial cost always looks formidable, but it need not. Overhead charges may be high in total; but when the divisor—annual production—is applied, the overhead charges per ton are found to be no greater than those on simpler mills. Thus, consideration of overhead investment is eliminated, and the lower operating cost and higher yield of the continuous mill are net gain.

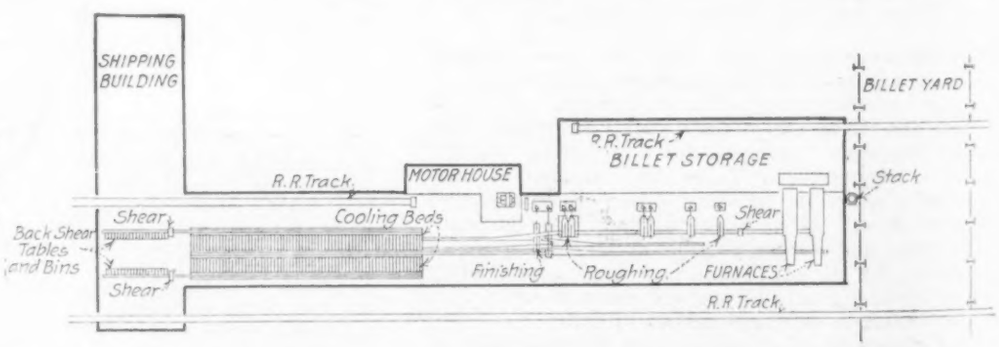


Fig. 15. George "Staggered Duo" Mill for the Production of Rounds, Flats and Angles

In this paper, continuous rolling has been described as it applies to the production of small billets, sheet bar, flat finished products, wire rod, and merchant bar—these being the products which, so far, have justified the investment in continuous mills. As to the future of the continuous mill, we know of no way to judge, other than by the past. Whenever, in the past 40 years, the demand for any product has reached such proportions that a single organization could market the output of a continuous mill, a continuous mill for that product has made its appearance.

Those most closely identified with continuous-mill development know that its possibilities have scarcely begun to be realized. They do not hesitate to predict

that, whenever a specialty in hot-rolled steel reaches the required point of standardization and demand, a continuous mill for that specialty* will be forthcoming, and that its appearance will mark a substantial reduction in the cost of that specialty.

Points in the Discussion

Studies have been made for producing skelp up to 24 and 28 in. wide in a continuous mill. The sum total of the peak requirements run up into such figures that, so far, no one has been willing to face such demands upon the power system. Power input is a function of torque and speed. The torque is high because the section is wide and thin; the speed must be high to permit finishing thin sections before they have cooled to call for too high a torque. Both these factors tend to make the power peak very high, for wide, thin sections.

This problem of determining the power peak of continuous mills is predicated upon the aggregate load, and usually this is represented by a mill full of steel, rolling its hardest section. Usually, also, the root mean square of the load can be arrived at accurately, and I believe it is a fair statement that there have been fewer undersize and oversize motor applications with continuous mills than (owing to the nature of the problem) has been the case with other types of mills, where the peak and the root mean square of the load can be computed for a set of given conditions, but where these conditions may or may not be the true criteria over the life of the mill.

The capacity of any heating furnace must have a limit somewhere. Suppose heating furnaces had twice their capacities, there would still be a limit. At the time of the development of continuous rolling mills, it was necessary to determine what heating capacity would best suit the average requirements, as, obviously, a furnace with too great a capacity would be uneconomical from the standpint of fuel consumption and scale loss. The experience of practically all continuous mills, over a long period of useful life, leaves little to regret. Where markets have been formed for the upper range of output of a given mill, instances of lack of balance seem to exist, with the result that the furnace is called upon to support a mill capable of turning out a tonnage greatly in excess of the average presupposed conditions for which it was built. Such mills require new furnaces of adequate capacity.

When a mill is designed to produce a wide range of products, there are inevitably certain compromise arrangements provided which prevent the mill from doing its best work on the products most desired, so that the result is ultimately less satisfactory than could have been obtained had the purchaser listened to sound engineering advice.

The steel strike of 1919 demonstrated forcibly the fact that the labor incidental to the operation of a continuous mill is greatly simplified, as compared with the requirements of a Belgian mill. For example, one large and well-disciplined corporation, which employs Garrett mills almost exclusively, was forced to recognize this fact throughout the strike. In other words, the skilled labor of a Belgian mill is usually so closely bonded together as to be almost the equivalent of organized labor, even though unions may not actually exist at such plants.

Continuous mills require a few expert men, whose familiarity with furnace and rolls will reduce the idle time of the mills to a minimum; and whose crews, working in concert, will clear a cobble and get the mill on again in the shortest possible time. The rolling-mill manufacturer can do only one thing—he can supply the mill and its auxiliaries; the mill can be made a success or a failure by the operating crew. Usually, continuous mills are a success from the start, because the importance of having a good crew has never been minimized. In those few instances where equivalent results under equivalent conditions do not soon materialize, and there is ample precedent, the management is not slow to use such measures as will bring results up to par. The mills getting the best results are those having the best heaters, rollers, finishers, etc.

*With the exception of sheets.

Will Have Hearings on Trade Association Bill

WASHINGTON, April 25.—Definition by a Government body of their power which they have long desired and which was one of the principal topics discussed at their recent meeting in Washington, with Secretary Hoover and other officials of the Department of Commerce, may be applied to trade associations sooner than has been generally thought probable. Stimulus of this idea given at the trade association conference at Washington and centered around a bill of Senator Edge of New Jersey, which provides this purpose has prompted the senator to arrange for hearings on the measure in the near future. This bill is in the Senate Committee on Judiciary which will hold public hearings and consider the subject. Assurance that this will be done has been given to Senator Edge by Senator Nelson of Minnesota, chairman, who last week informed Senator Edge that he will select a sub-committee to give full attention to the important subject.

The resolution to investigate trade associations which had been introduced by Senator Edge in the Senate and by Representative McArthur of Oregon, in the House, has been abandoned. Senator Edge said that he does not consider this important as the main object of the resolution is covered by the bill. The latter provides that trade associations, unless excused by it, shall file with the Federal Trade Commission statements of their purposes, activities, officials, etc., and also statistical data which they compiled, as well as other information, which the commission may require, the matter of making the information public being left to the discretion of the commission, which would be notified of all meetings of the associations. The latter could then obtain a ruling from the commission as to their legality, based on statements filed with the commission. In the event the commission found the plan of organization of the associations was not in violation of the anti-trust laws, the commission would approve the plan and the agreements between the association and its members, and would issue certificates to that effect. The certificates would be prima facie evidence of the legality of the associations and their purposes.

In cases where the commission was of the opinion that the applications of associations showed they were in conflict with antitrust laws, the applicants would be informed and proposed plans of reorganization, so as to conform to the law, would be suggested by the commission. Issuance of certificates would not be a prerequisite to the organization or operation of any trade association, but none would be entitled to privileges and immunities unless a certificate had been obtained.

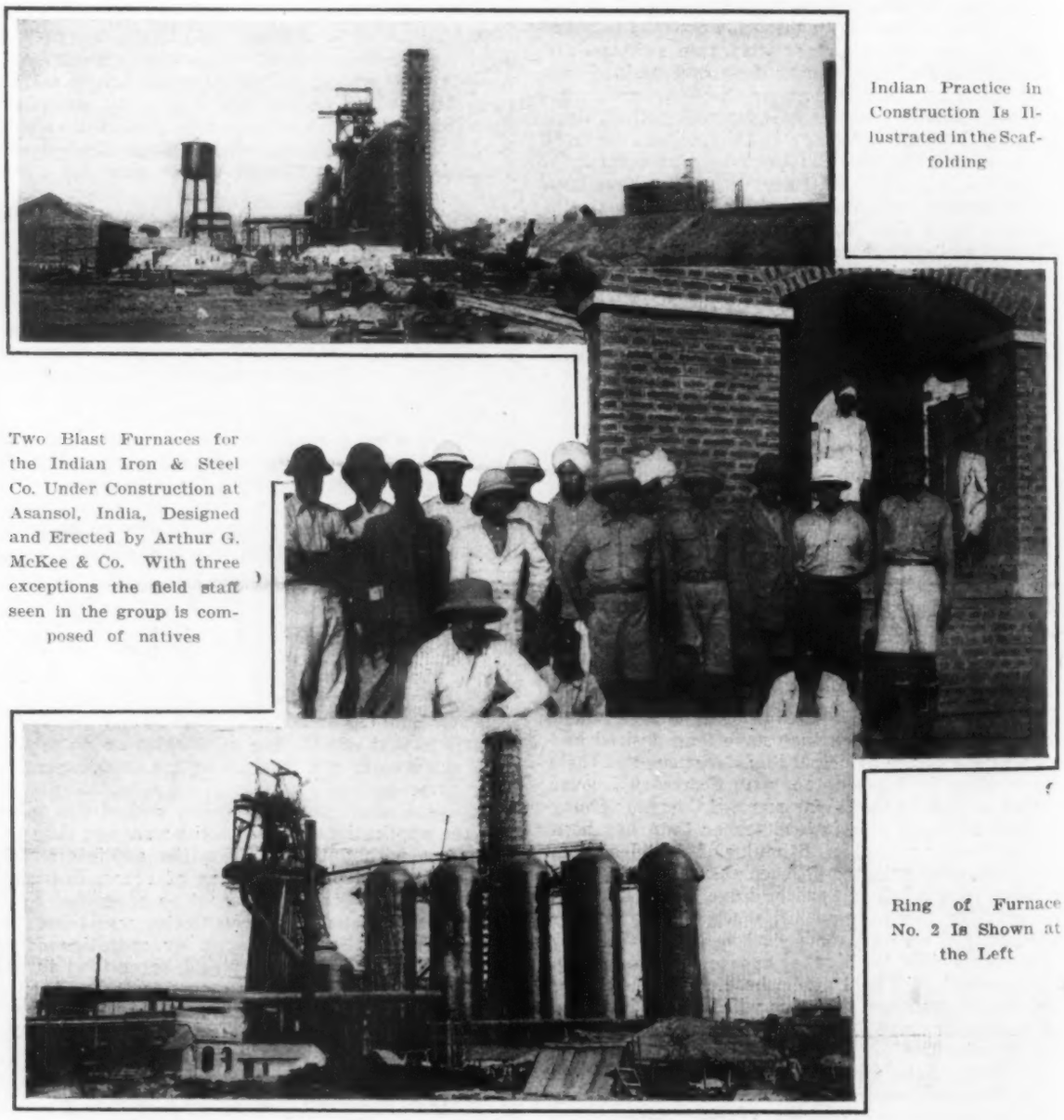
Trade associations would, through this legislation, be provided with interpretative rulings as to their legality, but there would be no hard and fast restrictions as to trade practices. So long as they came within the law, each association would be permitted to adopt its own practices and methods of procedure. It is believed altogether likely that the Edge bill, which is strongly supported by the great bulk of trade associations, would eliminate so-called open price associations, with which Secretary Hoover has said the Department of Commerce will not co-operate. It is a question when the Edge bill can be taken up for consideration in Congress, but it is hoped this can be done at the present session.

The Kissel Motor Car Co., Hartford, Wis., has increased its working schedule to 10 hr. a day, or 55 hr. per week, with about 80 per cent of its normal operating force employed, to handle increasing orders for passenger cars, motor trucks, and especially highway construction trucks with special body and hoist equipment.

AMERICAN STACKS IN INDIA

Cleveland Engineers Erect Two Modern Blast Furnaces at Asansol

The first unit of the blast furnace plant at Asansol, India, which Arthur G. McKee & Co., Cleveland, have been building for the Indian Iron & Steel Co., Ltd., has been practically completed. The furnaces were designed in strict accordance with American practice and embody the latest features in such construction. The illustrations give an idea of the practice employed in India in construction work. No. 1 furnace is well advanced. The lower rings of No. 2 furnace are shown at the extreme left of the lower halftone view. A portion of the field staff is shown in a group. It will be noted that a large majority are natives, the only Americans being the superintendent, assistant superintendent and bricklayer foreman. With native workers, some of them women, with temperatures reaching as high as 125 deg., and an average annual rainfall of 300 in., it can be appreciated readily that construction work in India is a difficult matter.



Indian Practice in Construction Is Illustrated in the Scaffolding

Two Blast Furnaces for the Indian Iron & Steel Co. Under Construction at Asansol, India, Designed and Erected by Arthur G. McKee & Co. With three exceptions the field staff seen in the group is composed of natives

Ring of Furnace No. 2 Is Shown at the Left

The ultimate plant layout of the Indian Iron & Steel Co., Ltd., provides for six blast furnaces of 350 to 500 tons capacity, a coke plant and finishing mills. Arthur G. McKee & Co. have had charge of the blast furnace design and erection, and practically all materials for the first two furnaces were shipped from this country. The coke oven plant was designed by Simon-Carves Co., Ltd., England, but the steel work and other materials for the plant came from the United States.

The activities of the Indian Iron & Steel Co., Ltd., are governed by G. H. Fairhurst and C. B. Chartres, who recently visited the United States to inspect American plants and observe furnace and mill practice in this country. Messrs. Chartres and Fairhurst are partners in Burn & Co., managing agents in India for the Indian Iron & Steel Co., Ltd.

Sintering Plant at Babbitt to Open Soon

The first unit of the Mesabi Iron Co.'s iron ore sintering plant at Babbitt, Minn., has been completed, and will go into operation on April 30, according to an announcement recently made at Minneapolis by D. C. Jackling, president, and W. G. Swart, vice-president of the company. The plant represents a large investment and was constructed after several years of experimental work conducted at Duluth by W. G. Swart and D. E. Woodbridge. Shipments of the sintered ore are expected to begin as early as June.

The International Blower Co., Inc., Hartford, Conn., capital $50,000, C. H. Keeney, president, has purchased the entire business of the Connecticut Blower Co., of Hartford, Conn., including the machinery, tools, stock, equipment, etc., and has removed to the International Blower Co.'s factory, 345 Trumbull Street, Hartford, Conn.

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ESTABLISHED 1855

THE IRON AGE

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The Will to Work

The measure of the amount of prosperity and real advancement the United States will enjoy in the next few years is the will to work on the part of its people. This, of course, is no newly expressed dictum, but it is one which cannot be kept too plainly or continuously in mind. In the longer future other factors will be prominent in controlling affairs, one of these factors being inventions. There may be inventions that will aid in accomplishing results, making possible greater advancement and prosperity with the same amount of work. At the present time new inventions are not helping much, for we have not had in the past few years the influx of inventions we once had.

Unwillingness to work except for a bribe was almost universal two years ago. Now it is far from universal, but it is still sufficiently prevalent to prevent the nation as a whole from making much real progress, in other words from really prospering; for the amount of work that men as a whole are willing to do is little if any more than sufficient to keep us going, supplying our daily wants. To illustrate with one citation, the portion of the family budget allotted to food may buy enough, but the portion allotted to make up for wear and tear of house furnishings and provide some improvement will buy but little. In the past two months the group "housefurnishing goods" in the Bureau of Labor's index number has stood at 213, average prices in 1913 being 100. These high prices are due to unwillingness to work on the part of somebody.

The influences causing unwillingness to work are numerous. Not all are connected directly or indirectly with the war. There is an unfortunate tendency to ascribe to the war nearly everything nowadays that is found unsatisfactory. It is easy to reflect that from the days of the hardy pioneers to the time just before the war the general willingness to work decreased. The hardest work and the longest hours served have been by immigrants, just what many of the pioneers were. Our national saving would have been greater, the wealth of the country a larger total, if the will to work had not decreased decade by decade.

As to the war, the influences have been direct and indirect. The easy money of wage earners during and after the war dulled the feeling formerly existing that one must work hard to live and must take care of himself. The impression remains that some one promised, in the war, that afterwards men would not have to work so hard for what they got, and that something or somebody must keep that promise and can be depended upon to do so. Then there were subtle psychological influences, impossible to analyze minutely. The war brought men closer together for a common purpose, and no doubt the feeling exists that the country somehow can aid the individual in leading an easier life. This feeling makes a curious mixture with the decline in respect for the rights of others produced by the terrible strife, this lessened respect for the rights of others encouraging labor unions to prey upon the mass of the people and endeavor to exact more in worldly goods for their labor than a fair allotment of the total production can furnish.

The labor unions now make little pretense of claiming that capital has that which it can disgorge to give them the extra amounts they demand. The facts are too well established as to what part of the total national income goes to capital and what part to the workers to permit such a claim to stand a moment unchallenged.

Should we expect the will to work to return in full measure? Not necessarily. The possibility that it will not return in full measure is one of the contingencies that men who wish to gage the prospects of future years must consider. We cannot tell what the sum total of the will to work will be five years hence. What we can count on with reasonable certainty is that there will be an evening up or leveling. Society assuredly will not tolerate the perpetuation of exclusive and privileged classes of workers, exacting more than a reasonable share of the total production for the amount of work they do. It will not countenance any groups of men indulging in a biennial vacation of one or two months for the purpose of securing unreasonably high unit prices for the work they do. That has been the policy of the United Mine Workers and of the building

trades unions in certain sections. If carpenters have an unduly easy time other men whose previous work has been harder will become carpenters. The new thing will be that of society protecting men in their right to make such changes. The people of San Francisco have recently done this precise thing and have been advertising their success to the rest of the country. The people of many other cities have failed even to make a beginning. Such community movements will increase the sum total in the country of the will to work.

Unions and Contracts

The president of the American Federation of Labor frequently has placed himself in the ranks of those who believe in violating the law and court decisions when contrary to their own personal ideas of justice. Now comes Mr. Gompers and declares himself opposed to the enforcing of contracts if the contracts are in the way of the labor unions. He was on the stand the other day, before the Lockwood Investigating Committee in New York, and was compelled to admit many acts of rank injustice perpetrated by labor unions. But he would not concede the reasonableness of the proposition that while the worker might sue his employer for failure to pay wages agreed to by contract, employers should have the right to sue workers for failure to supply service at wages agreed upon. He declared that there should be no remedy by law, but that patience should be exercised and organized labor given a chance to improve. He asserted that attempts to regulate wages by law had always been a failure. This is true, because the fixing of a minimum wage or a minimum price is an interference with natural laws, and is almost always a failure. There was an exception during the war, when the Government named minimum prices and public sentiment and patriotism insured adherence to the Government prices, even, as in the case of iron and steel products, when there was no law, but only an agreement between the President's representative and the manufacturers. But the difficulty of fixing prices and wages by law certainly does not prevent the enforcement of contracts. Business men, with few exceptions, regard contracts as binding and contract breaking as dishonorable.

The American people will hardly accept patience as an adequate remedy for contract breaking by organized labor.

Metals and metal products, according to figures of the Bureau of Labor Statistics, are closer to their 1913 average than any other of the groups reported upon. The metals in March were 14 per cent above 1913. The nearest competing item was farm products, 28 per cent above 1913. The average of the eight groups apart from metals was 57 per cent above 1913, or more than four times as high above the pre-war average as is the metals percentage. Metals during the peak of 1920 did not reach the high figure of other items. They did reach almost double the 1913 average, at 195, but none of the others was less than 240, while three of the groups were more than 340. Liquidation has been much heavier in metals than in any other group, standing now at 85.3 per cent, compared with 68.7 per cent as the average of the other eight groups and 69.8 per cent as the average of the entire list. These percentages represent the extent to which the excess of the peak price over the 1913 price has been wiped out.

Large Use of Scrap in Steel-Making

In an analysis of the pig iron and steel ingot production of the country for the first quarter of this year two facts stand out. One is the increasing spread between pig iron and steel outputs and the other is the marked increase in the percentage of open-hearth steel.

In January there was a spread of about 4,200,000 gross tons between the yearly rate of pig iron production and that of steel ingots or, expressed in another way, the pig iron rate of production was about 82.1 per cent of the steel ingot output. In March the spread between the two had increased to about 8,500,000 tons, with pig iron down to 73.8 per cent of steel production. In 1913, and even in 1919 and 1920, this relation was radically different.

Taking the open-hearth steel output, this increased from 79.3 per cent of the total ingots in January of this year to 81 per cent in March. In 1919, 1920 and 1921 this ratio was between 77 and 78 per cent, while in 1913 only 69 per cent of the total steel production was open-hearth. In tabular form the showing is as follows:

	Pig Iron of Steel Output, Per Cent	Open-Hearth of Total Steel Output, Per Cent
1913	98.9	69.0
1919	89.4	77.7
1920	87.6	77.5
1921	...	78.0
January, 1922	82.1	79.3
February, 1922	79.2	79.9
March, 1922	73.8	81.0

A principal cause of the striking change indicated above is the larger use of scrap in open-hearth melting. While the using up of accumulations of stocks of pig iron has been a contributing factor, the abundance and cheapness of scrap have been the predominating influence. Probably from 10 to 15 per cent more scrap has been used in the past few months in basic open-hearth charges than has been common practice in previous years.

It was once the belief that good basic open-hearth steel could not be made if over 50 per cent of the charge was scrap. This theory was shattered some time ago as the result of improvements in metallurgical practice, particularly in basic furnaces. Usual electric furnace practice consists of all scrap charges, and it is not surprising that open-hearth methods should approach this, within limits. Scrap has been very cheap for months, in comparison with pig iron. Should that condition change, the proportion of direct metal would no doubt rise and some plants might make larger use of duplexing.

Figures prepared by the London *Economist*, showing the flow of British capital into investment, indicate a radical change since pre-war time. In

the first quarter of 1912, 25.3 per cent of the capital investment went into the United Kingdom, 55.9 per cent went into foreign countries, and the remainder into British possessions. During the first quarter of 1922, 83.9 per cent went into the United Kingdom and only 9.5 per cent into foreign countries. It is evident that British capital is fully engaged developing home resources and that very little is available for outside investment. This is but one more indication of the diminishing influence of London in world finance.

Doing Real Service

Long noted for the high character of the reports and addresses made at its annual meetings, the National Metal Trades Association, at its twenty-fourth annual convention held in New York last week, fully maintained its reputation.

The thorough-going discussion of "American Industry and the Stabilization of Europe," by Prof. Harold G. Moulton, University of Chicago, presented a most impressive picture of the close relations of this country with the nations of Europe, and not only described the demoralized finances of the Old World, but suggested the possible methods of reconstruction. A short address by Magnus W. Alexander, managing director of the National Industrial Conference Board, was a fine example of modern research work. It was not a guess or an estimate as to wages and expense of living, but a presentation of facts, giving the original sources. The fallacy of the claim that every miner must have $2,600 a year in order to meet living expenses was shown in a convincing way, because investigators of the board had determined the cost of living and Mr. Alexander presented a most interesting computation as to how the whole income of the industries of the country would not be sufficient to meet the demands of the wage earners if all of them were paid as much as it is declared every miner must have in order to enjoy a comfortable living.

The address of President Loree of the Delaware & Hudson Railroad on "The Relations of the Railroads with Their Patrons" was a disappointment to anyone who expected denunciation of labor unions or of the Government, for the distinguished railroad executive had little to say of either, devoting himself largely to telling the members of the association how they could co-operate with the railroads in increasing the use of cars and reducing expenses. It was of great practical value. The address of James A. Emery on "Industrial Courts" was like all of his addresses, which have become an annual feature of the association conventions, in being clear, vigorous and convincing. The representative of agriculture, A. M. Loomis of the Washington office of the National Grange, gave a conservative statement of the suffering of the farmers and of the efforts of the so-called agricultural bloc to bring about better conditions. That the farmer has had many grievances cannot be doubted, but the resort to class legislation is always a dangerous one.

At a time when the disposition in some quarters is to question the usefulness of trade associations, the program of the National Metal Trades Association was such a mine of information and able discussion and was so indicative of beneficial activities that it went far in answering the strictures that have been so common among prejudiced or unthinking critics.

Railroad Earnings

Percentages earned, on the annual basis, by Class I railroads have been as follows, according to the computations of the Bureau of Railway Economics:

	1921	1922
January	0.1	2.69
February	Def.	4.57
March	2.3	
April	2.2	
May	2.4	
June	3.1	
July	4.5	
August	5.0	
September	4.6	
October	5.4	
November	3.85	
December	3.4	
Year	3.3	

The system used in computing the 1921 percentages was to take the annual earnings requisite to make 6 per cent on the tentative valuation, allocate the total to the respective months in the proportions shown by the record of the three-year "test period," ended June 30, 1917, adopted for the purpose of the Government's guarantee when it took the railroads over, and then compare the earnings shown with those apparently required. As the test period was not infallible, the monthly variations shown above may not be entirely conclusive, but no question arises as to the year's results, that the railroads earned in 1921 only a trifle more than half as much as they were expected to make out of the rates that went into effect in August, 1920. For January and February of both years a new system is used, allocating earnings, to allow for seasonal variations, in accordance with the showing of the five years ended Dec. 31, 1916.

In addition to this record for 1921 the first two months of this year are now reported upon, showing a rate for the two months of 3.61 per cent, or less than two-thirds the expected rate. Of course the comparison with the corresponding months of 1921 is "favorable," but one cannot feel convinced that a permanent trend in the right direction is established, seeing that in 1921 earnings increased and then decreased again.

The comparison between the first two months of 1921 and 1922 shows that the total operating revenues decreased 9.2 per cent while the total operating expenses decreased 19.9 per cent. Possibly no further material decrease in operating expenses can be made without lower wage costs. It is not even certain that operating expenses can be held down. The railroads seem to need increased revenue, while railroad officials are altogether indisposed to admit that total revenue can be increased by reducing rates.

In THE IRON AGE of April 20 the suggestion was made that manufacturers having plans for combatting depression communicate them to the National Bureau of Economic Research, of which Dr. Wesley C. Mitchell is director. The offices of the bureau are at 175 Ninth Avenue, New York.

CORRESPONDENCE

On Getting Back Our Steel Trade with South America

To the Editor: In your issue of April 20 you comment editorially on "Steel for South America," and you rightly conclude that "our exporters of steel have a good-sized job cut out for them in these countries to the south."

Having for some years exported steel to various countries and in particular to Brazil and Uruguay, we were very much interested in your remarks, but we fear that even in pointing it out you probably did not quite realize the size of the job which confronts the American exporter to South America.

The entire trouble seems to reside in the recent policy of our country, policy which can best be condensed in the old French proverb that "Scalded cat fears cold water."

This country has never tackled our neighbors to the south in a truly American way, and when South America found the markets of the world were closed and was forced to buy steel here, our manufacturers concluded that their old policy of cash against documents here was amply justified, as when steel was needed credits were duly opened in New York and no terms were discussed. What was wanted was steel and the usual fencing for time to pay, so dear to South American hearts, had, therefore, to be shelved temporarily.

A good many exporters, in the "hay days" of 1919 and 1920, really did suffer a change of heart, and seeing that their South American customers were paying spot cash as against domestic buyers getting 30 and 60 days' time, they became a little ashamed of themselves, and, sedately at first, very boldly thereafter, they began attaching 30, 60 and 90 days' sight drafts to their documents and, in their minds, the South American markets were as good as "cinched" for us for all time.

June, 1920, marked the beginning of loud South American wails for draft extensions and the latter were granted, willy-nilly, for there really was no other alternative. Some of these drafts are still being extended, but the great majority of those accepted by really first-class houses have been paid with full interest added thereon.

To those who have followed the vagaries of South American exchanges, it is ancient history that the South American drawees who had to request extensions and have since paid up, have done so to the tune of two and three times the original value of the bills, in terms of their own moneys, and they deserve no small amount of respect for their general handling of the situation.

So far as concerns the amounts involved for those who came to grief, no statistics are available, but if banks were to tell, it would be found that the total runs well into nine figures. Both the exporters and the banks have been heavy losers, but they have learned their costly lesson and they know now quite a little more about their own business and also as to who is who among those paying their bills.

In the meantime, what happened to the manufacturers?

Nothing, or really next to nothing. They were still getting cash for their goods, and to this day their main anxiety is to see that their title to the goods is clear, until the necessary settlement gold has rolled into their coffers. The exporters and the banks stood the storm as well as they could. The banks which were able to, wrote off their losses. Those who were not, either disappeared or came under the control of others.

As far as the exporters were concerned, their trade became the one where mortality reached the highest percentage. They paid all they could and then went to the wall, dragging down with them those manufacturers gifted with vision who had trusted them, but who unfortunately were a trifling minority in the manufacturing community.

To-day, the greatest boast of any treasury department is that, touching wood, they had lost nothing in the crash, and there is no doubt that they will continue without losses if they persist in the old cash against documents terms. They may, however, ponder on the axiom, "Nothing risked, nothing gained."

We are, therefore, faced in the export business with several retarding influences, to wit:

1. The exporters are still suffering from acute "cold feet," and their credit extensions are confined solely to choice risks and then only within their own financial limits, as outside help is lacking.

2. The banks have become over-cautious and more than ever refer to the limitations placed on them in the discounting of export paper.

3. The manufacturers continue to wash their hands of all the financial details connected with exports and will grant, at the most, domestic terms, and the latter only to firms worth many times the credit asked.

If we now take the concrete example of a steel sale to the Brazilian Government, we find that according to Brazilian law it is well-nigh impossible to secure payment until 90 days after arrival, inspection and acceptance of the goods. This means that if an exporter is to finance such a deal he will not see his money for about six months. How many exporters can afford such a luxury without adequate financial support?

This will explain why to-day American steel offerings are practically nil, to the great enjoyment and profit of Germany, England and Belgium. Our competitors in South America are granting terms of payment, and certainly no one will accuse them of being in better financial shape than we. It goes without saying that exchange conditions have been greatly against us, but we must not forget that if the necessary sacrifices are not made promptly, South Americans will revert to their old "bad" habits and forget us as providers of what they need.

It is useless for us to insist on cash against documents, when the nationals of countries debtors to ours continue to offer the terms of payment to which South America, rightly or wrongly, is accustomed, but without the assistance of both the manufacturers and the banks we must needs confine our export sales to our own individual and corporate financial abilities. This may perhaps explain to you the why and wherefore of our drooping steel exports to South America. We have accumulated gold but we are not using it.

There is another point of importance in connection with sales in South America: The governments of the various southern republics happen to be the largest purchasers in their respective countries, and to those who are initiated it means much just to make this statement. The conditions created by the above-mentioned fact have been a thorn in even the largest exporters' sides, and most of them content themselves with furnishing quotations to local importers, leaving it to the latter to finance and juggle the contracts according to their own particular Hoyle.

We are, therefore, faced with the peculiar fact that although most of our representative firms operate their own offices in the countries involved, their names seldom if ever appear in the official bidding, and our country suffers thereby a most decided loss of prestige.

Criticism, unless constructive, is worthless, and it would be wise then for us to express an opinion as to a possible remedy to present conditions. Our prices have come down, while those of our competitors have gone up. We are now almost again on competing ground and it is high time that we should go after steel exports with a vengeance. The exporters are to-day carrying all the load they possibly can carry unaided, and this opens the question to what extent our banks and manufacturers can help.

The banks have perfected their credit information services, and with the renewed courage and foresight of which they are now giving abundant proofs there is no doubt that they will aid exporters, even if they have to resort to the old European practice of using official diplomatic channels to hasten collections.

This leaves the manufacturers, and they are the

hardest nut to crack.

So far as the exporter is concerned, so long as goods are in transit inland, they are of no earthly good to him, and it is therefore unfair to count inland transit days against him. Once the exporter has loaded his material on board ship and is armed with an ocean bill of lading, he is beginning to derive benefits, and it is from that time that terms against him should originate. The time elapsing from the date of the inland shipment to that of the ocean bill of lading, is an uncertain quantity, but it has lately been assumed at 30 days, which is fair. Our contention is that the 30 or 60 days' terms usually given on domestic business should begin only after the 30 days' shipping grace have elapsed. In other words, we advocate 60 and 90 days' terms where 30 and 60 now prevail.

Being exporters, we would naturally want to see suppliers meet us half way, study with us the nature of the risk involved, and then, if the deal does not look too much of a gamble, take chances with us and thereby take an active part in export trade. Knowing the present temper of the average manufacturer, we voice the above very feebly, having voiced it so often that we are hoarse; but we think they will see the light some day. Let us hope it will not be too late!

TROPENAS COMPANY,
G. Muntz, President.

New York, April 21.

Continuous Gas Supply from Single Blast Furnace

To the Editor: In the issue of THE IRON AGE of April 13 appeared an abstract of the paper read by W. S. Hall before the Association of Iron and Steel Electrical Engineers and of a discussion by Gordon Fox. To this discussion an editorial note is added to call attention to the Sparrows Point gas holder installation for equalizing gas quantity and pressure.

It should also be of interest to point out, as a supplement to that discussion and with particular reference to the blast furnace plant of but one stack, the numerous successful installations of Brosius automatic mud guns. Using this mud gun, it is a matter of accepted furnace practice to keep the blast on during the tapping period, thus eliminating the interruption of gas supply. In fact, a particular function of this mud gun is to insure a continuous gas supply. The operation of the gun is completely controlled from manifolds on the cast house wall and no men are near the tapping hole.

In England also, where comparatively small and single unit plants prevail, this equipment is well known as a means of securing continuous gas supply.

O. J. ABELL.

Chicago, April 18.

What "Unbeschadet" Means in a German Sales Contract

To the Editor: In order to give truth and justice due regard, the undersigned believes that the article headed "Warning Concerning a German Selling Method," printed on page 1080 in your April 20 issue, should not pass unchallenged. The inferred accusation of deception said to be contained in the German manufacturers' selling clause is unfounded and undoubtedly is based on an insufficient understanding of the German language by your correspondent.

As a matter of fact, the clause in the German manufacturers' contract, "Die preise sind festpreise, d. h. die Materialien werden zu dem in kostenanschlag eingesetzten preis berechnet, unbeschadet innerhalb der lieferungszeit eintretender preiserhöhungen," actually does mean what both buyer and seller intended it to mean, namely, that "the prices are fixed prices, i. e., the goods are to be invoiced at the prices stated in the estimate, unaffected by any (regardless of or without any prejudice to) price advances taking place during the time of delivery."

The word "unbeschadet" does not mean "exception made for" or "all my rights being reserved," as your correspondent would have it, but as stated above, "unaffected," "regardless," or "without prejudice."

Therefore, the subject of your report is rather a case of a Dutch trader getting away with the order by employing a little dose of the tactics for which Philadelphia lawyers have become famous.

GEORGE SCHERR.

New York, April 22.
126 Liberty Street.

Cost of Living Continues to Rise

Monthly figures of the Bureau of Labor Statistics show the wholesale prices of all commodities during March to be 52 per cent above the average for 1913, compared with 51 per cent in February, 48 per cent in January and 49 per cent in both December and November. Two of the nine individual groups showed a rise in March compared with February, these being farm products, with 2 points, and miscellaneous, 3 points. Metals and clothing showed decreases of 1 point each.

Metals and metal products, which now stand at 14 per cent above the 1913 average, are far lower than any other group listed. This item is now 14 points below farm products, and more than 20 points below any of the others. The highest item on the list still continues to be housefurnishing goods, which, together with building materials, are more than double their 1913 prices.

While metals are only 14 per cent above their 1913 level, the average of all the others is 57 per cent (or more than four times as far) above the 1913 level.

Our table shows the figures for the two most recent months and for March, 1921, and the peak in 1920. It shows also the amount of liquidation, between the 1920 peak prices and the present, of the excess of the peak prices over the average of 1913. Metals have been liquidated 85.3 per cent, farm products 80.8 per cent and the others less than 80 per cent.

Index Numbers of Wholesale Prices, by Groups of Commodities
(1913 equals 100)

	1920 Peak	1921 March	1922 Feb.	1922 March	Liquidation, Per Cent
Farm products	246	125	126	128	80.8
Food, etc.	287	150	138	138	79.7
Cloths and clothing	356	192	183	182	68.0
Fuel and lighting	284	207	183	183	54.9
Metals and metal products	195	139	115	114	85.3
Building materials	341	208	202	202	57.7
Chemicals and drugs	222	171	159	159	51.6
House-furnishing goods	371	275	213	213	58.3
Miscellaneous	247	167	150	153	63.9
All commodities	272	162	151	152	69.8

The Machinery Club of Chicago has elected new officers and directors for the year 1922-23, as follows: President, H. E. Procunier, president Moon Mfg. Co.; vice-president, D. R. Hoffman, secretary Steel Sales Corporation; secretary, H. S. White, co-manager Cleveland Twist Drill Co. at Chicago; assistant secretary, H. F. Kempe, H. F. Kempe & Co.; treasurer, H. J. Reeve, Reeve-Fritts Co.; directors, Harry Barrett, Barrett-Christie Co.; C. J. Becker, Becker Brothers; S. A. Ellicson, Chicago Pulley & Shafting Co.; E. L. Essley, E. L. Essley Machinery Co.; F. L. Kohlhase, National Stamping & Electric Works; J. R. Porter, Marshall & Huschart Machinery Co.; W. W. Ziege, Mechanics & Traders Bank.

The Standard Engineering Co., Ellwood City, Pa., has just completed and shipped to the British Mannesmann Tube Co., Landore, South Wales, what is probably the largest tube reducing machine ever built. It weighs 200 tons and while designed primarily for the reduction of hot tubes from 3¼-in. down to 1½-in. it can be adjusted for reducing to other sizes.

Bids for eight rolls of wire fencing, four bundles of brace wire, and three kegs of staples, will be received by the Norfolk & Western Railway Co., Roanoke, Va., on April 19. J. H. Clemmitt is purchasing agent.

Italian Steel Industry Much Hampered

Ansaldo and Ilva Failures Were Serious—High Raw Materials a Drawback—Chief Activity in Motor and Railroad Cars

(Special Correspondence)

MILAN, ITALY, April 10.—The past year has been without doubt one of the worst Italian industry has known although the depression which hit all the great countries of the world did not affect so much the Italian steel companies, thanks to the high exchange and to the revision of the custom tariff. Duties were increased to such an extent as practically to prevent any import from abroad. The steel companies, well protected by the exchange and the high duties, could work at 60 per cent of their normal activity, a remarkable record compared with the lower percentage of the French, British and American works, which in some instances had even to suspend their activities for a few months.

The Ansaldo and Ilva Failures

From the financial point of view, however, the year 1921 was a very bad one and there were two notable downfalls among the big steel manufacturers of Italy—Ansaldo and Ilva. These two concerns, which had a capital of over 800 million lire, broke down on account of the impossibility of carrying out their farreaching programs, which were conceived during war time.

It has developed that Ilva's fall was due to financial speculations. Its managers, among them the well known politicians and financiers, Sig. Luzzatto and Sig. Bondi, had organized in recent years a stupendous chain of companies with the purpose of each being supported by the other. The companies financed or owned by Ilva were over a hundred, and while during the war, thanks to the Government's orders, all of them worked to capacity and paid large dividends, as soon as the demand slackened and orders became scarce they closed their books with enormous losses and the breakdown of one company meant the ruin of the entire chain.

To give some idea of the extent of the collapse of the company it is sufficient to compare the present value of Ilva's stock, about 14 lire, with its par vaue of 200 lire.

The important banks, such as Banca Commerciale Italiana, Banca Italiana di Sconto and Credito Italiano, which had invested heavily in Ilva's enterprises, in order to safeguard their own credits deemed it necessary to create a new company, the Società Esercizi Siderurgici e Metallurgici, with a capital of 100 million lire. It has taken over and is operating the more important Ilva steel plants and the profits will be employed for paying Ilva's debts.

Regarding Ansaldo, its precarious financial situation had been known to all for two years, but the Banca Italiana di Sconto seemed to have such unlimited confidence in its future as blindly to finance the company to the extent of over 700 millions lire, and this brought the collapse of the bank.

After the war it was generally admitted that Ansaldo's future was far from being brilliant, as the armistice surprised this big concern right in the midst of exceedingly heavy investments of capital in new plants and installations. The plans of the two general managers, the Perrones, while apparently full of genius and daring, were considered too ambitious and out of all proportion with Italy's economic potentiality and capacity of absorption. The Ansaldo electro-metallurgical plants at Cogne were wonderful, but industrially speaking they were not worth the enormous amounts expended for their construction. To-day the Ansaldo company is trying to find some means of getting on its feet again by cutting out such parts of its peace program as cannot be realized at present for lack of funds and completely reorganizing the plants anew. A new management has been appointed by the stockholders and the Perrones have retired from active participation in the business.

The fall of Ilva and Ansaldo did not have serious consequences in the country at large, as the burden of losses was mostly sustained by the big banks which had foreseen the calamity and taken steps for self-protection, with the exception of the Banca Italiana di Sconto, which continued in the policy of financing Ansaldo and other tottering concerns. The other Italian steel companies had an uneventful year. While they did not declare dividends, still they closed the year with but little loss or a slight surplus.

Labor Recognized the Situation

The continuous shutting down of plants convinced labor that its only course was to stop agitation and accept reductions of wages. Very few strikes broke out during the year and the number of idle workmen while high was still far below the figure of other countries. This was due to the fact that most of the unemployed steel workers who before the war were farmers went back to agriculture, further, by shortening the shifts in the steel plants, it was possible to engage a considerably greater number of hands.

The tendency of prices was continually downward for the first half of the year, but toward the end there was a slow but gradual increase, due mostly to the new tariff and to the price fixing system.

Steel Companies' Agreement

Apart from a few, the Italian steel plants have had a temporary agreement under the leadership of the Società Esercizi Siderurgici e Metallurgici, whereby prices of steel commodities are fixed by mutual consent. The prices are regulated according to foreign competition and exchanges. In this way the steel companies avoid underbidding each other, but it is feared that the arrangement will be disturbed sooner or later by the tariff revision, which is strongly advocated by a number of members of the Chamber of Deputies, especially by the Agrarians.

One of the chief obstacles to the return of the Italian industry to normal activity has been the deficiency of electric power due to the persistent drought of this winter. Most of the Italian plants are operated by hydroelectric stations. The scarcity of water forced the plants to replace quickly their hydroelectric stations with steam, oil or gas engines, which increased costs and caused reduction of working hours. Illustrating the seriousness of the situation, Genoa, the center of metallurgical plants, has had more than seven months of dry weather. Even drinking water was at a premium in that city.

Activity in Motor and Railroad Cars

The automobile industry and railroad car builders have had their plants comparatively active for a year, the former benefiting by a lively export demand and the latter by important orders placed by the railroad administration. The railroad car manufacturers, however, did not live up to their delivery schedules, as appears from the following:

Rolling Stock	Ordered in the Year 1919	Delivered up to End of 1921
Passenger cars	610	63
Baggage cars	250	210
Freight cars	2,960	1,892
Steam locomotives	486	163
Electric locomotives	78	None

On the heavy orders placed early in 1921 by the Italian railroads nothing was delivered up to the end of the year.

Imports of raw or finished products from abroad

were negligible in 1921, mainly because of the huge increase of custom duties. Only Germany favored by the rate of exchange and low prices, succeeded in exporting to Italy a considerable tonnage of finished material. From France was imported chiefly scrap steel in sufficient quantity to cover the moderate demand of Italian works.

Pig iron demand has been limited for more than a year; first owing to the high duty (over 200 lire per ton), and further to the stocks still existing from the war, which have been sufficient to take care of the demand. The exorbitant price of pig iron, which is today in Italy more than twice the price of scrap steel, has compelled the steel manufacturers to make a more extensive use of scrap; in fact it has been reported that some makers have employed scrap steel up to 95 per cent.

Italy being a very small producer of pig iron, there is seemingly no other explanation for the high duty imposed by the Government on this product than that of protecting and encouraging the new industry for the production of synthetic pig iron in electric furnaces.

No New Steel Capacity

Owing to the bad times and to the lack of proper financing, little or nothing has bee done by the Italian steel companies in the line of remodelling their plants. No new furnace or rolling mills have been added to those existing nor have any efforts been made to set in motion the idle ones which were started during the war and shut down shortly after the signing of the armistice.

Production of steel scarcely reached 350,000 tons in 1921, while during the war it went above 1,300,000 tons in a year.

American raw and finished materials have been completely beyond reach of the Italian market, owing to the exchange prices. There seems, however, to be a strong probability for the United States to come again into the Italian market for the sale of modern steel plant equipment. Also American scrap might make some headway into Italy, provided the ocean freight rates decrease and the exchange continues to improve

Italy's economic position has been bettering rapidly during the last two years. The Government budget will soon be brought to a solid basis and the deficit completely covered by the new taxes. It is within bounds to reaffirm the prophecy made in THE IRON AGE two years ago, that Italy will be one of the first European countries to recover from the war and get back to normal conditions.

ERNESTO D'AMICO.

Shortage of Labor in Chicago District

For the first time since 1920 a shortage of labor is being felt by iron and steel works in the Chicago district. The situation is by no means acute, however, and is accounted for by the fact that during the long period of part-time operation both skilled and unskilled workers left the district for other locations which offered employment. The revival in production has been so sudden that much of this labor has not yet found its way back to the plants. While a considerable number of foreign-born workingmen, largely of the unskilled class, have returned to their fatherlands in the past year and a half, it is the belief of operating officers of Chicago plants that there is plenty of labor of all classes to be had, but that it is simply a question of bringing labor and the work together. A similar situation recently arose in the automobile district in Detroit and vicinity. With the slump in automobile production labor returned to the farms or to other cities where employment could be found, and when plant operations revived, a shortage of labor was experienced until men could be attracted from the fields to which they had dispersed. The problem at hand seems to be not one of an absolute shortage of labor, but rather one involving a redistribution of labor.

The Bethlehem Steel Co., has ordered on furnace B. at its Steelton, Pa., works.

GERMAN TOOLS BUILT CHEAPLY

D. de Vries of Stokvis & Sons Comments on Recent Exhibition—Quality a Forgotten Institution

An interesting communication regarding the status of the German machine-tool industry, as shown by a recent exhibition in that country, has been received by George R. Woods, New York, American representative of R. S. Stokvis & Sons, Inc., from D. de Vries, director of the parent company at Rotterdam, Holland.

This letter, which comments freely on the German machines with comparisons of American and German tools, is in part as follows:

The writer is just back from Germany, where he visited the Leipziger Technische Messe. It would be very instructive for an American to visit such a "Messe" because one could then give industrial America much interesting information.

If one dwells along the stands, where for the writer each machine is an old acquaintance, be it always in changed designs, his eye is caught here and there where he says: "Not bad! By Jove, the Americans have a big competition!"

If one sees the stand of Kaboma radial drills, one must admit that's a big drill, but if we then think of Uncle Henri's and Tuechter's machine, we say: "Well, that young machine is an engineering problem for the workmen, too many ornaments, it wants a college boy to handle it."

If one sees the stand of Zimmermann, one must say: "Not bad." Special designs of these machines are excellent. The general manager of this concern was formerly a prominent manager of Schuchardt & Schutte, so you see the link?

We had a talk with Samson, makers of vertical grinders, type of Pratt & Whitney, not bad, and these people also make a shaper. The manager pretended it was a copy of Gould & Eberhardt. Now listen, he only pretended it was a copy.

It might have been a copy of a gone-by shaper of Gould & Eberhardt, but both Mr. Peskine and the writer laughed heartily in his face and we told him: "You Germans try to copy and when you are ready with your copy, the American again has escaped and looks only upoh it as of bygone days."

The general impression of such an exhibition—and it was a big exhibition only of machine tools—is that there is life and drive in the Germans, but that the class of their machines and workmanship is miles below the American standard, but they manufacture cheaply and to-day there is but one desire in the world: Buy cheap, buy cheaper, buy cheapest, buy for nothing. Quality does not speak any more in Europe; it is the price that talks and as long as German labor is as cheap as it is to-day and the call for low prices so strong as to-day, the world of to-day in machine tools is to the Germans.

We saw copies of a Cincinnati milling with Wanderer, copies of Kearney & Trecker with Mammuth, but how poor copies they were! We explained to one of them what treatment the gears go through in America, before it is a gear, ready to be put in place, and they listened with an open mouth and they said, "Yes, that's nice, but we would not get paid for it." You see, cheap.

In lathes there was nothing special; a good German lathe as you know it for one-quarter of the price of yours and less.

Where America, England, France, Spain, Italy and all the smaller countries are struck with a depression as the living world has hardly ever met, there is a big boom in Germany. Most of the machine tool firms are sold out for six to eight months and everybody on this exhibition looked gay and prosperous.

By the present export organization Germany has shaped for itself, by which they only let escape machinery for export at a fixed price, a price about double as high as their inland price, but about half as low as the rest of the world asks, they have formed, so to say, a world for their own, in which they all prosper and vegetate on the rest of the world and one has to ask whether it is more luck to win a war than to lose a war, and at present the answer would be confirmative to the last item, if after all the whole world was not one undivided unit, but knowing this, common sense will say such a thing cannot last forever and if such an artificial condition as the one to which Germany has shaped itself falls through, they will fall well. It can continue only by a continuous depreciation of the value of their exchange. The exchange of to-day is 250 marks for the dollar. So a little more and the mark has no value at all and what then?

Our final impression of this visit to the Leipzig Exhibition was that Germany is not killed, but keenly alive and that she will fill on the long run her own place and that place will not be the place the American machine tool builders are looking for and that is to be top notch in design and workmanship, in service and production.

Coke Output Less; Little Unionizing

Many Connellsville Miners Would Return to Work and an Early Break Is Possible Seeing That No Strike Benefits Are to Be Paid

PITTSBURGH, April 25.—While this the fourth week of the strike in the western Pennsylvania non-union coal district has seen some desire on the part of a good many of the men who have been out to get back to work, this is chiefly among those who did not want to quit and were forced into idleness by the defection of others. This strike is essentially one of the pick miners and loaders, who by laying down their tools have made it impossible for others to work. The organizers have made a special drive to get these men out because they are such an important cog in the general operations. They have been preyed upon and no statement, no matter how absurd, calculated to pull them out and keep them out, has been left unuttered.

Coke Production Falling

The situation still is serious, particularly from the standpoint of coke supplies, this region being depended upon for a considerable part of the requirements of furnaces in this immediate district as well as in districts to the north and east. The Connellsville *Courier*, in its most recent compilation of coke production, shows that for the week ended April 15 the district produced 98,810 tons, a loss as compared with the previous week of 35,610 tons, and 51,150 tons compared with the week ended April 1. For the week ended April 22 a further substantial loss is indicated, this paper states, by the fact that more than 2400 additional ovens went on the idle list.

No one seriously questions that the outcome of the strike will be a crushing defeat for the men. While the results to date have been in favor of the union organizers, the belief prevails that the advanatge will be short lived. If the union leaders had been content to confine their efforts to the mines of the independent companies of the district and had not challenged the H. C. Frick Coke Co., the Steel Corporation coal and coke subsidiary, they stood a chance to win. The union leaders calculated cleverly in the means adopted to achieve the ends thus far accomplished, but they failed to reckon with the Steel Corporation aroused.

Talk of Long Struggle Not Relished

What must eventually count heavily for the collapse of the strike is that no strike benefits are to be paid to the new members, and the organizer who declared in a speech Saturday night that the fight would last all summer unconsciously weakened the will of those who voluntarily quit, for they no doubt went out with an idea of a brief struggle.

This strike has some of the characteristics of the steel strike of 1919. It was defection of the foreign born rather than of the native born. It is founded on misrepresentation by the organizers, who have hesitated at nothing calculated to bring the credulous foreigners out, even telling them that since Germany and Russia had made peace, the funds necessary to the successful prosecution of the strike would be forthcoming from Germany. The suspension of mine operations is more complete in that portion of the district radiating south and west of Uniontown than in the opposite direction. The explanation is racial. West and south of Uniontown southern Europeans predominate, and they respond more to mob movement than do the Celts, Scots and other English-speaking men of the older workings north and east of Uniontown. It has not been difficult to frighten the Slavs, Greeks and Italians by suggestions of violence.

Young Men Ignorant of Past Defeats

It has occasioned no little wonder that in a region where the men had been counted upon to stay at work, so many have gone out and mining operations have been so heavily crippled. The explanations are numerous. The principal ones are that agitators have been planted in the mines for some time and they have been quietly sowing the seed of discontent, so that the strike in the union fields might not be snuffed out by too much production of non-union coal. Then there was the usual spring restlessness and desire to be out of doors, and April 1, being only a couple of weeks in advance of Easter, there was not the desire to stay at work. There is no doubt, too, that as it is almost 30 years since the last strike in the region, few now active can recall how disastrous it proved for the miners. The strike really is a "lark" for the ring leaders, most of whom saw service overseas in the world war.

There has been a complete lack of disorder because no attempt is being made to prevent meetings of the men. It is a rule of the State police that there shall be no parades and none are being held. Breaking up of meetings is not tried because it is realized that this would mean small meetings in houses, with none of the publicity or knowledge of what is going on that can be had when the meetings are held in large groups in public places.

With No Strike Benefits, Connellsville Miners Likely to Go Back

UNIONTOWN, PA., April 25.—The strike situation in the Connellsville bituminous region is apparently a stalemate. Union organizers, after closing down the Leisenring No. 1 plant of the H. C. Frick Coke Co., were unsuccessful in suspending operations at Leisenring Nos. 2 and 3, Davidson and Trotter, strongholds of the Frick company in the old Klondike region. Working forces at these plants were impaired, but work was not suspended.

At other points in the region there is an increase in output, more men reporting to work at mines throughout the territory, although not in great numbers. At Amend and Collier plants on Monday there were two demonstrations led by women. One group of amazons used salt and pepper to effect in an attack upon the working miners. Two women were arrested, but later released. The other group dispersed when officers prepared to turn hose lines on them.

Absence of Strike Benefits Discouraging

Meetings were held in Connellsville and near Mount Pleasant on Sunday. Van Bitner, speaking at Connellsville, said that newly organized locals would receive "just as much and no more than the strikers of the old union fields." Speakers at the meeting, when asked to say what that meant, replied by asking what the men in this region had ever done for the union. Later they attempted to salve over the break. A group of newly organized union men in the Brownsville region are reported to have notified union organizers that unless strike benefits are paid at once they will return to work. Union speakers at mass meetings of the men have refrained from promising financial assistance to the strikers here, but there apparently have been promises on the outside. One statement is that the union will pay strike benefits to men of six months' standing in the union.

Break May Come Soon

Developments of an important character are expected now almost any time. There is a pretty strong

(*Continued on page* 1182)

Iron and Steel Markets

OUTPUT LITTLE CHANGED

Connellsville Coke Falls Off and Pig Iron Output Is Less

New Business in Steel at a Lower Rate — Some Price Advances

The fourth week of the coal strike has brought no important change in the rate of steel production. In blast furnace operations there are some cross currents. In the East two smaller merchant furnaces have blown out and another is short of coke. Against this is the blowing in of a large Youngstown furnace, the expected starting of a Wharton, N. J., and a Midland, Pa., stack and the probable blowing in of a merchant furnace in the Chicago district.

Coke output in the Connellsville district was cut down further last week to about 55 per cent of that for the last week in March, but there is little actual unionizing of idle men. May 1 is the date now considered likely to mark a turning point in the situation, seeing that no strike benefits are promised to miners joining the union, and that many idle men have expressed a desire to return to work.

In conserving fuel supplies some blast furnaces tributary to the Connellsville district are running their blowing engines more slowly and are making fewer tappings. However, steel output is less affected, as producers are using more scrap and drawing on accumulated stocks of pig iron.

Some mills are taking no new orders with definite delivery promises and most of them are booked for several weeks ahead. Thus, with some consumers seeking to buy for prompt shipment or trying to speed up deliveries on contracts, price advances are named which in fact apply to a relatively small portion of going business.

Buying of coal by Pittsburgh and Youngstown interests in Virginia, southern West Virginia and Kentucky fields has been on a large scale, and in addition to the freight for these long hauls mine prices have advanced, so to an extent the strike is advancing the cost of making iron and steel.

The cases in which 1.60c. or more is paid for plates, shapes or bars are exceptional and the tonnages are not large. The plate market has shown more activity than in some time, and operations at the plate mill center of Coatesville, Pa., are on a larger scale than in many months. A good demand at firmer prices has developed for plates in the lighter gages.

Considerable sheet business has been taken at the recent advance of $3 per ton. Automobile and automobile parts makers, for the first time in more than 18 months, are going to Pittsburgh to expedite deliveries.

Seeing that consumers of steel are generally well covered, the present situation, barring an unexpected turn in the coal strike, is creating little concern regarding either prices or supplies. Nothing resembling a steel scarcity is expected, and conservative influences are much in evidence.

The Steel Corporation's earnings of $19,339,000 in the first quarter, with monthly increments almost exactly paralleling the declines in the last quarter of 1921, indicate a share of the March steel output larger than was generally credited to the Corporation at the time. Important independent steel companies are still showing deficits and some of these will persist through the second quarter.

Fabricated steel lettings for the past week, including transmission towers for Formosa, are less than half of those of the week preceding or between 55 and 60 per cent of shop capacity. Not a great tonnage of new work appeared but structural mills are that well engaged that rolling schedules need to be consulted closely in naming delivery dates.

With the expected Chicago & Northwestern letting of 2750 cars the total for the week will be 6500. The Southern Pacific order was for 2000 and the Chesapeake & Ohio bought 1700. Apart from railroad buying, new business in steel shows a considerable falling off.

Preceding the recent advance of pig iron to $21 at Chicago, there was very heavy buying in that district, one merchant having sold 150,000 tons. Iron can still be had there at $21, although some sellers are asking $22. Throughout the East and in the Pittsburgh and Ohio territories, there has been a general advance of $2 on foundry and malleable grades and $3 higher on basic has been established by a sale of 10,000 tons at Cleveland at $23, furnace, for delivery at Massillon, Ohio. Charcoal iron is up $2 and silvery is again $1 higher. Alabama iron is established by an advance of 50c. at $16.50 as the prevailing quotation.

Export trade has fallen off this month from the March rate. Earlier in the year Japan figured largely in the buying, but is now doing little, financial conditions there being less favorable. Great Britain latterly has cut more of a figure in South American trade. In Far Eastern business the chief contract of the week came from Japan—6500 tons of rails and tie plates.

Pittsburgh

PITTSBURGH, April 25.

The effect of the strike in the non-union coal fields of western Pennsylvania is even more pronounced this week than it has been at any time since the trouble began. Although there is a disposition in some quarters to minimize results of the cutting off of coal and coke from the Connellsville district, and there is little apparent sign of recessions in plant activities, the fact is that in a number of lines manufacturers have found it necessary to apportion their production. The real story will be developed by the figures of pig iron and steel production, which will be available early in May. In the conservation of fuel supplies, the wind has been cut down on a number of stacks in this and near-by districts and some furnaces are being tapped only once instead of twice every 24 hours. Loss of ingot production probably will not be as great as that in pig iron because the steel makers have been increasing the melt of scrap and cold pig iron. Very few of the steel manufacturers now are quoting because they have nothing on which to quote, and those who remain nominally in the market are not especially active in trying to obtain additional business.

Prices are extremely firm all along the line and

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Apr. 25, 1922	Apr. 18, 1922	Mar. 28, 1922	Apr. 26, 1921
No. 2X, Philadelphia‡	$25.40	$25.40	$21.26	$26.26
No. 2, Valley furnace†	**23.00**	21.00	19.00	24.50
No. 2, Southern, Cin'ti†	**21.00**	20.50	19.50	27.50
No. 2, Birmingham, Ala.†	**16.50**	16.00	15.00	23.00
No. 2 foundry, Chicago*	21.00	21.00	20.00	24.00
Basic, del'd, eastern Pa	21.50	21.50	20.25	25.00
Basic, Valley furnace	**23.00**	20.00	18.00	22.50
Bessemer, Valley, del. P'gh	**23.96**	22.96	21.46	26.96
Malleable, Chicago*	21.00	21.00	20.00	24.00
Malleable, Valley	**23.00**	20.50	19.00	25.00
Gray forge, Pittsburgh	**24.46**	22.71	20.71	25.46
L. S. charcoal, Chicago	**28.00**	26.00	26.00	38.50
Ferromanganese, seaboard	65.00	65.00	62.50	90.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	29.50	29.50	28.00	37.00
O.-h. billets, Pittsburgh	29.50	29.50	28.00	37.00
O.-h. sheet bars, P'gh	31.00	31.00	29.00	39.00
Forging billets, base, P'gh	34.50	34.50	32.00	42.00
O.-h. billets, Phila	35.24	35.24	35.24	42.74
Wire rods, Pittsburgh	38.00	38.00	36.00	48.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb	1.50	1.50	1.40	2.20
Light rails at mill	1.50	1.50	1.40	2.20

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.86	1.86	1.76	2.35
Iron bars, Chicago	1.65	1.65	1.60	2.38
Steel bars, Pittsburgh	1.50	1.50	1.40	2.10
Steel bars, Chicago	1.60	1.60	1.60	2.48
Steel bars, New York	1.88	1.88	1.78	2.48
Tank plates, Pittsburgh	1.50	1.50	1.40	2.20
Tank plates, Chicago	1.60	1.60	1.60	2.58
Tank plates, New York	1.88	1.88	1.78	2.58
Beams, Pittsburgh	1.50	1.50	1.40	2.20
Beams, Chicago	1.60	1.60	1.60	2.58
Beams, New York	1.88	1.88	1.78	2.58
Steel hoops, Pittsburgh	2.00	2.00	1.80	2.75

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Apr. 25, 1922 Cents	Apr. 18, 1922 Cents	Mar. 28, 1922 Cents	Apr. 26, 1921 Cents
Sheets, black, No. 28, P'gh	3.15	3.15	3.00	4.00
Sheets, galv., No. 28, P'gh	4.15	4.15	4.00	5.00
Sheets, blue an'l'd, 9 & 10	2.40	2.40	2.25	3.10
Wire nails, Pittsburgh	2.40	2.40	2.40	3.25
Plain wire, Pittsburgh	2.25	2.25	2.25	3.00
Barbed wire, galv., P'gh	3.05	3.05	3.05	4.10
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.60	$6.25

Old Material, Per Gross Ton:				
Carwheels, Chicago	**$19.50**	$19.00	$17.00	$14.25
Carwheels, Philadelphia	16.00	16.00	15.75	18.00
Heavy steel scrap, P'gh	**17.00**	16.50	15.50	13.00
Heavy steel scrap, Phila.	**14.50**	14.00	13.50	11.00
Heavy steel scrap, Ch'go	**15.00**	13.75	12.75	11.00
No. 1 cast, Pittsburgh	**17.50**	17.00	16.50	18.00
No. 1 cast, Philadelphia	17.50	17.50	17.00	18.00
No. 1 cast, Ch'go (net ton)	**15.50**	15.00	14.25	13.50
No. 1 RR. wrot, Phila.	16.00	16.00	15.50	17.00
No. 1 RR. wrot, Ch'go (net)	**13.00**	12.00	11.75	10.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$5.50**	$5.00	$3.25	$3.25
Foundry coke, prompt	**6.00**	5.00	4.25	4.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	**13.00**	12.87½	12.87½	12.75
Electrolytic copper, refinery	**12.75**	12.62½	12.62½	12.37½
Zinc, St. Louis	**5.00**	4.90	4.65	4.95
Zinc, New York	**5.35**	5.25	5.00	5.45
Lead, St. Louis	**5.20**	4.95	4.42½	4.35
Lead, New York	**5.40**	5.15	4.70	4.35
Tin (Straits), New York	**31.12½**	31.00	29.25	32.00
Antimony (Asiatic), N. Y.	5.00	5.00	4.35	5.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, April 25, 1922, Finished Steel, 2.084c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

April 18, 1922,	2.084c.
March 28, 1922,	2.019c.
April 26, 1921,	2.764c.
10-year pre-war average,	1.689c.

Composite Price, April 25, 1922, Pig Iron, $21.98 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

April 18, 1922,	$20.40
March 28, 1922,	18.38
April 26, 1921,	23.46
10-year pre-war average,	15.72

there have been some further advances by some of the steel manufacturers. The Bethlehem Steel Co. yesterday came out with 1.70c., Pittsburgh, on plates, shapes and bars, while the Brier Hill Steel Co. is quoting plates at 2c., and sheets at an advance of $7 per ton over those established earlier in the month.

There has been a clear advance of $2 per ton in foundry iron, which has sold at $23 for the base grade, and with basic iron at $23 in Cleveland, it is probable that any business that develops with Valley furnaces will be at that price. This compares with $20, the basis of the last previous transaction. Some large purchases of scrap by a large independent steel company have caused a further advance of 50c. per ton, the basis for this purchase being that pig iron production cannot be increased because of the fuel situation. Buying of coal by Pittsburgh and Youngstown interests in Virginia, Southern West Virginia and Kentucky is on a heavy scale and in addition to a heavy freight rate the price in those districts has advanced. The strike situation thus is adding to the producing cost of iron and steel and while conditions in the western Pennsylvania non-union field are slightly better this week than they were last week, the gain has been almost too slight to be worthy of comment. The ordinary production of this field is approximately 8000 cars daily, while current loadings are averaging about 1700 carloads or about 22 per cent. At the low point loadings went below 20 per cent.

Pig Iron.—A further advance of $2 per ton has been established in foundry iron since a week ago with sales of No. 2 grade noted at $23, Valley furnace, and of No. 3 iron at $22.50, and there is none of either grade now available at less. An even greater advance has taken place in malleable iron, sales of which have been done at $23, Valley furnace, as compared with the former quotation of $20.50. There has been no business in basic iron in this district in the past week, but since this grade has brought $23 at Cleveland furnace, on a large tonnage sold to a Massillon consumer, that price probably will be done on the next important transaction in Valley iron. This price is purely an appraisal because there seems to be no basic iron for sale by Valley producers, but on the other hand there are no important inquiries in this market. The highest price paid on Valley Bessemer iron is $22, furnace, and that only for small lots. Instead of being at a premium

over basic iron, Bessemer now is at a discount of $1 per ton, this condition being explained by the fact that some Bessemer is available while basic grade is extremely scarce as far as availability for market is concerned. The only change in the active list of blast furnaces in this and nearby districts is that the Carnegie Steel Co. has put on an additional stack at its Ohio works, Youngstown, to replace one recently blown out for repairs. This company now has 32 furnaces in blast. The Pittsburgh Crucible Steel Co. probably will blow in one of its steel furnaces at Midland, Pa., before long. This company has a stock of coke and its coal mine is one of the few not affected by the strike.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$23.00
Bessemer	22.00
Gray forge	22.50
No. 2 foundry	23.00
No. 3 foundry	22.50
Malleable	23.00

Ferroalloys.—A few small sales of 80 per cent domestic ferromanganese are noted at $70 Atlantic seaboard, to consumers not getting full deliveries on orders entered at lower prices. The Carnegie Steel Co. is quoting this material at $72.50 Atlantic seaboard, but is practically out of the market. English makers have not followed the recent advance to $70 by domestic producers, but the common expectation is that they will. The leading maker of spiegeleisen is out of the market on 20 per cent material, and is quoting $33 furnace on 16 and 19 per cent alloy. There has been no business in this district lately in either grade. Jackson, Ohio, producers of Bessemer ferrosilicon and silvery iron, as of April 19, made another advance of $1 per ton.

We quote 78 to 82 per cent ferromanganese, $70 to $72.50 c.i.f. Atlantic seaboard for domestic and $65 for English. Average 20 per cent spiegeleisen, $34 furnace; 16 to 19 per cent, $32 furnace; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson to New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Iron and Steel Pipe.—Makers of steel pipe now are experiencing no difficulty in securing orders; on the contrary, most of them are finding it necessary to limit the business buyers would like to have them take. Thus far the fuel situation has not seriously affected production of any of the leading manufacturers, but the fear exists that unless there is an early resumption in the non-union fields, curtailment is inevitable. The Dec. 16, 1921, card of discounts appears to have been very fully re-established. There are intimations that a new card naming higher prices may come out, it being argued that there is no profit on the present card, but it is doubtful whether an advance in prices will be made in the near future because important interests believe that buyers would construe the action as being due to the fuel situation. Makers of wrought iron pipe report a steady and well-sustained improvement in orders. Discounts are given on page 1177.

Wire Rods.—All makers are committed as heavily as they care to be on present fuel supplies, and while no sales are noted at higher than $38, Pittsburgh or Youngstown for the base size of soft rods, no orders could be placed at that price today. Makers merely are looking out for the requirements of regular customers and are refusing new business. Prices are given on page 1177.

Wire Products.—The American Steel & Wire Co. as yet has taken no action with regard to the advances made by the independent manufacturers three weeks ago. It is becoming very difficult for buyers to enter new orders or to increase their original specifications. Actually, most of the independent manufacturers are out of the market. There has been no change in prices, but the market is very firm.

We quote wire nails at $2.40 to $2.50 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.25 base per 100 lb., Pittsburgh.

Billets Sheet Bars and Slabs.—Non-integrated sheet and tin plate manufacturers, heavily sold up on the finished products, and getting only a portion of the tonnages of sheet bars due them on contracts, are actively seeking additional tonnages on the open market. With most makers finding a use for all of their current production, offerings are extremely limited. Sales have been made at $33 in Cleveland, but the price of those who have any tonnages available generally is $35, mill. An Eastern maker recently quoted $32 mill, against a brokerage inquiry for 5000 tons the delivered price being $37.33 to this district. Billets are not available at less than $31.50 for 4-in. and $33 for the smaller sizes. The walkout of non-union coal miners has not materially affected the production of steel, but it has prevented an expansion of steel works activities that was necessary to meet the heavier bookings.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $29.50 to $33.50; 2 x 2-in. billets, $31 to $35; Bessemer and open-hearth sheet bars, $31; slabs, $30 to $34.50; forging billets, ordinary carbons, $34.50 to $37, all f.o.b. Youngstown or Pittsburgh mills.

Sheets.—While supplies of sheet bars still are sufficient to enable most makers to maintain the recent rate of operations, they are not large enough to permit an increase in mill activities as is warranted by the orders already on the books and few consumers are getting their full quota. Mills quite generally are falling behind their orders and as far as tonnages for early delivery are concerned, the situation is extremely tight. A Youngstown district manufacturer in the past week announced an advance of $7 per ton, putting prices to 3.50c base for black, 4.50c. base for galvanized and 2.75c. base for blue annealed. There has been no response to this move on the part of other manufacturers, and few consumers are so hard pressed for supplies as to be willing to pay these prices, which represent advances $10 per ton over what prices at which they have orders placed with makers. Automobile manufacturers, however, are showing some anxiety about supplies of full finished sheets, and are trying to get the mills to anticipate deliveries by about 30 days. Some business has been placed at the advance set up early in the month, but no business is reported any higher than these prices. Prices are given on page 1177.

Tin Plate.—The situation with regard to supplies for early delivery still is very tight, due to the fact that all makers are committed against full production for the next 30 or 60 days, and those depending on outside sources for supplies of steel lately have not been getting more than half their normal quotas on contracts. A movement is understood to be on foot among independent makers to advance prices for the third quarter. The claim is made that present prices allow no profit, but as against this it is reported that considerably less than $4.75 per base box Pittsburgh, was done by an independent maker recently. The American Sheet & Tin Plate Co. has 80 per cent of its tin mills scheduled for this week, and independent mill operations average about 80 per cent, but the prospect is for a decline among the latter due to the growing scarcity of steel. We quote $4.75 per base box, Pittsburgh.

Boiler Tubes.—Demand for seamless steel tubes still is gaining and prices continue to strengthen. These tendencies, however, are lacking in lap-welded tubes, on which a large Eastern maker is reported to be still giving 3 fives on top of the quoted discounts. Prices restrict sales of charcoal iron tubes. Discounts are given on page 1177.

Cold-Finished Steel Bars and Shafting.—Production is beginning to be affected by the fact that makers of hot rolled bars are unable to ship fully against contracts. This development has further strengthened the market which now is firm at 1.90c. base Pittsburgh, for carloads, while the old differential of $5 per ton for less carloads, for some time waived, has reappeared. Ground shafting is unchanged at 2.25c. base, mill, for carload.

Hoops and Bands.—Makers are holding firmly to 2c. base Pittsburgh, for both products, are committed as heavily as they care to be on the present fuel supply, and are not anxious for new business.

Plates.—The American Bridge Co. has received a contract for a wharf boat and four barges for the Barrett Line, Cairo, Ill., for which 1000 tons of steel will be required, mostly plates. The same company has taken two car floats for the Long Island Railroad which will take 1500 tons of steel, mostly plates. The Dravo Contracting Co. is low bidder for three steel barges, bids for which were opened April 21, by the Pittsburgh Federal Engineers, between 400 and 500 tons of steel, chiefly plates, will be wanted. It is expected that the steel pipe for the Fairmont Reservoir Water Line, Cleveland, which will require 3000 tons of plates, will be fabricated by a local company. The market is showing more activity than before in some time and the price situation is extremely strong, because only a few makers are open to business. There has been no change in the price of the Carnegie Steel Co., but independents are quoting 1.60c. to 1.70c., and a Youngstown mill which is not anxious for business, lately has been quoting 2c., Pittsburgh.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.70c., f.o.b. Pittsburgh.

Iron and Steel Bars.—Inability of makers to enlarge ingot production to the extent demanded by orders is putting makers behind in their deliveries and the market, as far as early tonnages are concerned, is very firm. The Carnegie Steel Co. still is holding at 1.50c. base, Pittsburgh, and is taking orders at that price for delivery at its convenience. Independent makers who remain in the market generally are quoting 1.60c., and yesterday the Bethlehem Steel Co. announced a price of 1.70c., Pittsburgh. There is no change in bar iron prices, but demand is increasing and there are intimations of an early advance.

We quote steel bars rolled from billets at 1.50c. to 1.70c.; reinforcing bars, rolled from billets, 1.50c. to 1.70c. base; reinforcing bars, rolled from old rails, 1.50c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—Convinced that the lowest prices have been seen on steel and with an idea of getting in before there are further advances, investors are closing with some promptness against projects long before the market. The McClintic-Marshall Co. will furnish between 1000 and 1100 tons of steel for a spaghetti factory of H. J. Heinze Co., Pittsburgh, and 500 tons for a building for the American Thermos Bottle Co., Huntington, W. Va. An award of the steel for the new Pittsburgh Y. M. C. A. Building, involving 1500 tons, is expected shortly. The Fort Pitt Bridge Co. has taken 500 tons for a bank building in Morgantown, W. Va., and it is reported to have been awarded 300 tons for the shop connections with the warehouse here of the Crane Co., Chicago. The American Bridge Co., in addition to numerous small domestic jobs, will fabricate 3000 tons of high tension transmission towers for export to Japan and 500 tons of transmission towers for shipment to Chile. Plain material prices are firmly established as 1.50c., Pittsburgh, as a minimum, with independents quoting 1.60c. to 1.70c., the latter price having just been named by Bethlehem Steel Co. Prices are given on page 1177.

Skelp.—Hardly enough business is being done to establish prices, but a fair appraisal of the market is from 1.50c. to 1.70c., or the same range as is quoted on plates.

Steel Rails.—There has been no withdrawal from the market of any of the makers of light rails, because they can be rolled from defective standard rails or billet and bloom crops, and hence do not suffer from the shortage of steel. There is a fairly good run of business considering the coal mine suspensions. All makers are quoting 1.50c. base.

We quote 25 to 45-lb. sections, rolled from new steel, 1.50c. base; rolled from old rails, 1.40c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Nuts and Bolts.—The market is firmer, but this trend is in sympathy with steel prices rather than because of a good demand. Business shows improvement, but is not active nor is buying urgent. Discounts are given on page 1177.

Rivets.—The market is firm at the minimum of $2.10 base per 100 lb. for large structural and ship rivets and 10c. per 100 lb. higher for heavy boiler rivets. Demand still is reported to be gaining. Prices and discounts are given on page 1177.

Coal and Coke.—So little coke and coal is available from nearby mines that prices are largely a matter of negotiation. On such lots of furnace coke as have lately been moved, prices have ranged from $5.50 to $6 per net ton oven, while sales of foundry coke have been noted at $6 to $6.25 at oven. The coal market is chiefly in the product of the southern West Virginia, Kentucky and Virginia fields, which are not affected by the present labor disturbance. Prices of mine run coal in those fields range from $2.50 to $3.25 per net ton, the freight rate into Pittsburgh being at least $3.50 per ton, while to the Youngstown district and the lake ports there is a minimum rail rate of $2.66. These fields are the chief dependence of most steel making centers to piece out existing stocks and such lots as are coming out of the western Pennsylvania district.

Hot-rolled and Cold-rolled Strips.—Leading makers are making no special effort to advance prices beyond those recently established, of 2c. base Pittsburgh for hot-rolled and 3.65c. base Pittsburgh for cold-rolled. Rather, the effort is to hold the market at these prices despite the fact that the demand is good and many buyers are seeking early deliveries.

Spikes.—Not much activity is shown in standard spikes as makers generally allowed the railroads to enter orders for their requirements over a considerable period prior to the advance in prices early in the month. Restriction of coal mine activities is reflected in the demand for small spikes. The advanced prices are firmly adhered to, however, because of the upward trend of bars. Prices are given on page 1177.

Old Material.—Purchase of between 20,000 and 25,000 tons of heavy melting steel by a large independent at $17.50 delivered, has added strength to this market. This company cannot increase its pig iron production on account of the fuel situation and to safeguard full performance of its contractural obligations took on this tonnage. Unless there is an early termination of the labor troubles in the non-union coal districts, which would permit the starting up of idle blast furnaces, it is probable that still higher prices will be established for heavy steel scrap. Dealers are unwilling to let go of yard stocks at current prices and production of scrap is not increasing at all rapidly. Reports that Carnegie Steel Co. soon would be in the market for a large tonnage of scrap find no support, indeed, it is stated officially that the company has all the tonnage it requires for some little time and is not in the market.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows per gross ton:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$17.00 to $17.50
No. 1 cast, cupola size	17.50 to 18.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	16.50 to 17.00
Compressed sheet steel	15.00 to 15.50
Bundled sheets, sides and ends	13.50 to 14.00
Railroad knuckles and couplers	17.50 to 18.00
Railroad coil and leaf springs	17.50 to 18.00
Low phosphorus standard bloom and billet ends	20.00 to 20.50
Low phosphorus plates and other grades	19.00 to 19.50
Railroad malleable	15.50 to 16.00
Iron car axles	25.00 to 26.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	17.50 to 18.00
Cast iron wheels	16.50 to 17.00
Rolled steel wheels	17.50 to 18.00
Machine shop turnings	12.75 to 13.25
Sheet bar crop ends	17.00 to 17.50
Heavy steel axle turnings	14.50 to 15.00
Short shoveling turnings	13.50 to 14.00
Heavy breakable cast	17.25 to 17.75
Stove plate	13.50 to 14.00
Cast iron borings	14.00 to 14.50
No. 1 railroad wrought	13.00 to 14.00

Chicago

CHICAGO, April 25.

The transition from a buyers' to a sellers' market has taken place in hardly more than a month's time. The coal strike no doubt hastened the change by removing the hesitation which characterized the attitude of purchasing agents in a weak market. The stocks of virtually all consumers were exceedingly low and when general buying for replenishment developed, the effect was to fill up the rolling schedules of the mills for some weeks ahead. The disappearance of prompt deliveries in turn made it incumbent on the users to place still larger orders for forward delivery to protect their later needs. While it is probable that there has been some speculative buying, mills are of the opinion that most of the business placed represents known requirement.

The coal strike has not yet resulted in any curtailment of mill or furnace operations in this district, nor is it likely to do so for 60 or 90 days. The principal effect on the local production situation has been to cause mills to refrain from adding to their active pig iron capacity and to use more scrap in the open hearths instead. The leading interest has increased its steel output to 86 per cent of ingot capacity, but has not blown in additional blast furnaces.

With the recent starting of two new mills at Gary, the Chicago district became an important producer of strip steel. This commodity is used largely in the automobile industry, which is now active. A Wisconsin producer of automobile parts is now consuming 15,000 tons of strip steel per month.

Recent advances in finished material have been followed by advances in semi-finished commodities. Billets are now quoted at $31 base, mill, and sheet bars at $33.

Pig Iron.—Exceptionally heavy buying preceded the recent advance in local iron to $21 base, furnace. The leading merchant booked close to 150,000 tons in the course of a week. Some individual purchases ran into the thousands of tons and covered requirements for some months. A user of basic, in fact, contracted for 40,000 tons for delivery over the next six months. Sales since the advance have also covered considerable tonnage, as the general feeling of buyers is that further advances will probably be made. Some iron is now being sold at $22 base, furnace, or another dollar up, but this price is not yet general. The coal strike has undoubtedly given the market added strength, although it is notable that a large part of recent bookings has been to cover known requirements. The situation may be summed up by saying that supplies of most users were low and the coal strike furnished the necessary impetus to bring out general buying for stocks. The strike is unlikely, however, to affect production in this district for some time as furnaces have large supplies of fuel on hand. Stacks further east, however, are not so well stocked and it is possible that this may result in iron being shipped out of this district to sections where production is first curtailed. While no further additions to local merchant iron production has been made, it is not at all unlikely that another Iroquois furnace will be blown in very soon.

Southern iron continues to enter this district both by the all-rail and the barge and rail route. The lowest quotation on Southern iron for all-rail shipment is now $16.50, base Birmingham, and two producers have withdrawn from the market entirely. Charcoal iron has advanced $2 a ton and silvery has gone up another dollar.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$28.00
Northern coke, No. 1, sil. 2.25 to 2.75	$21.50 to 22.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	21.00 to 22.00
Northern high phos.	21.00 to 22.00
Southern No. 2, sec. quar.	21.92 to 23.17
Southern No. 2, third quar.	22.42 to 23.17
Malleable, not over 2.25 sil.	21.00 to 22.00
Basic	21.00 to 22.00
Low phos. Valley furnace, sil. 1 to 2 per cent copper free	30.00
Silvery, sil. 8 per cent	34.82

Ferroalloys.—Several additional contracts for 50 per cent ferrosilicon have been closed at $55. Ferromanganese has advanced to $70 seaboard with some sellers quoting $72. The lowest current quotation on spiegeleisen is now $46.50, delivered.

We quote 78 to 82 per cent ferromanganese, $78.40 to $80.40, delivered; 50 per cent ferrosilicon, $55, delivered; spiegeleisen, 16 to 18 per cent, $46.50, delivered.

Steel Castings.—The miscellaneous castings for railroad cars recently placed are still largely pending. While there is some irregularity in prices, the general tone of the market is firmer and advances in some classes of castings are expected.

Cast Iron Pipe.—Milwaukee opened bids April 21 on 6930 tons of 54-in., 36-in. and specials. Bids on both cast iron and steel pipe were submitted, the bid of the United States Cast Iron Pipe & Foundry Co. on iron pipe being the same as that submitted under the original call of March 29. It is regarded likely that cast iron pipe will be bought. Stevens Point, Wis., has let 700 tons to the American Cast Iron Pipe Co. The National Cast Iron Pipe Co. has the contract for 200 tons at Dubuque, Iowa. Pending business includes: Decatur, Ill., 530 tons, bids to be opened May 1; Downers Grove, Ill., 150 tons, April 27; Bay City, Mich., 500 tons, April 24; Fort Wayne, Ind., 120 tons, April 25.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $47.10 to $48.10; 6-in. and above, $43.10 to $44.10; class A and gas pipe, $3 extra.

Rails and Track Supplies.—Business in track supplies is brisk with prices advancing. Tie plates are now up to $37 mill, while the market on track bolts appears to range from 3.10c. to 3.15c., Pittsburgh.

Standard Bessemer and open hearth rails, $40; light rails rolled from new steel, 1.50c., f.o.b. makers' mills.

Standard railroad spikes, 2.15c. to 2.25c., Pittsburgh; track bolts with square nuts, 3.10c. to 3.15c., Pittsburgh; tie plates, steel and iron, 1.85c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Bolts and Nuts.—Business is coming from all sources, even from the farm implement makers, who are now placing some fair-sized orders. Bolt makers are steadily increasing their operations, the principal limitations now being inability to get deliveries of steel. Discounts are strong on the advanced basis. A local maker has advanced structural rivets to $2.20 and boiler rivets to $2.30 on small rivets the ruling market appears to range from 70 and 10 and 10 and 5 off to 70 and 10 and 10 off. Warehouse prices on rivets, bolts and nuts have also advanced as indicated below. For mill prices, see finished iron and steel f. o. b. Pittsburgh, page 1177.

Jobbers quote structural rivets, 3.15c.; boiler rivets, 3.25c.; machine bolts up to ⅞ x 4 in., 60 and 10 per cent off; larger sizes, 60 off; carriage bolts up to ⅞ x 6 in., 60 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3.50 off; blank nuts, $3.75 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off. Quantity extras are unchanged.

Structural Material.—More than $100,000,000 worth of new business and hotel structures are under way or will soon be started in Chicago. This indicates the scope of the building activity which has developed in this city only recently. Fabricating shops are generally busy and in some instances have found it necessary to buy from Eastern mills at 1.60c. and 1.65c., Pittsburgh, in order to secure desired delivery. While one local producer is still booking plain material at 1.60c., Chicago, for delivery at its convenience, its rolling schedules are practically full for three months. Fabricating awards include:

Table house, Corn Products Refining Co., Kansas City, Mo., 440 tons, to Vierling Steel Works.

Morrell Packing Co., plant addition, Ottumwa, Iowa, 220 tons, to Union Foundry Works.

Ward Baking Co. plant, Chicago, 200 tons, to Union Foundry Works.

Pending business includes:

Consistory building, Denver, Col., 1500 tons.

Federal Reserve Bank, New Orleans, 500 tons.

The mill quotation on plain material is 1.60c. to 1.70c., Chicago. Jobbers quote 2.38c. for plain material out of warehouse.

Wire Products.—Demand for wire and nails, as well as for special ties, is heavy. The leading interest

has not yet followed the advances of the independents, but the latter are booking business at the higher figures. For mill prices see finished iron and steel, f. o. b. Pittsburgh, page 1177.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.10 per 100 lb.; No. 9 and heavier bright basic wire, $3.25 per 100 lb.; common wire nails, $3.25 per 100 lb.; cement coated nails, $2.75 per keg.

Plates.—Orders and specifications are the best in two years and mill deliveries are becoming more and more remote, being in the case of one important local interest 90 days ahead. While some business for delivery at mill convenience is still being booked at 1.60c., Chicago orders on which earlier shipment is desired are being placed at 1.80c. We note sales of 700 tons and 1200 tons respectively at the latter price.

The mill quotation is 1.60c. to 1.80c., Chicago. Jobbers quote 2.48c. for plates out of stock.

Bars.—The transition between a buyer's and seller's market has taken place in hardly more than a month's time. In some instances, users who failed to cover for their early needs are finding it necessary to place orders with Eastern mills at 1.60c. and 1.65c., Pittsburgh. While some business in soft steel bars continues to be placed at 1.60c., Chicago, this is for delivery at mill's convenience with the earliest possible shipment three months away. With demand heavy from every source except the farm implement makers, it is notable that they too are placing increasing quantities of steel and expect to be on full production by early autumn. Demand for reinforcing bars is still expanding. For the Belknap Hardware Co. warehouse at Louisville, the Ohio Falls Iron Co. will furnish 2500 tons. The same mill will supply 200 tons for the International Harvester Co. warehouse in Louisville. For the Petoskey, Mich., Portland Cement Co. plant the Inland Steel Co. will furnish 200 tons. The Illinois Highway Commission has let 60 miles of road work, requiring 600 tons, and still has 40 miles of work to place. Demand for bar iron has improved materially and is coming from a wide variety of sources, indicating that slow deliveries on mild steel have caused many users to substitute iron. All hard steel bar mills are now quoting a minimum of 1.60c., Chicago. Bookings of hard steel have also shown a conspicuous increase, with business coming in from bedstead manufacturers, farm implement makers, steel post producers, reinforcing bar contractors, and other sources.

Mill prices are: Mild steel bars, 1.60c. to 1.70c., Chicago; common bar iron, 1.65c., Chicago; rail carbon, 1.60c. mill or Chicago.

Jobbers quote 2.38c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.30c. for rounds and 3.80c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.20c. base. Hoops, 3.23c. Bands, 2.98c.

Warehouse Prices.—Local jobbers have advanced bars, plates, shapes, hoops and bands 10c. per 100 lb., reinforcing bars 20c., cold-rolled steel bars and shafting and sheets 15c., and nails and wire 25c. The new prices are published under the appropriate paragraphs.

Sheets.—With deliveries from the mills growing more remote, users who are short of material for early requirements are scurrying for steel with the result that the position of producers is exceedingly strong. A number of Eastern independents, in fact, have again advanced their prices.

Jobbers quote blue annealed, 3.53c.; black, 4.30c.; galvanized, 5.30c.

Old Material.—The market is increasingly active and prices are steadily advancing. The steel mills continue to make generous purchases of open-hearth grades, while the gray iron foundries, malleable plants, iron mills and miscellaneous users are also buying, although in some instances they pay the advancing prices reluctantly. There is no doubt that much of the strength of the present market is attributable to the coal strike, which has caused steel producers to refrain from blowing in additional blast furnaces and to use larger quantities of scrap in the open hearths. If the strike lasts long enough to force the mills to reduce present operations, their scrap requirements will be reduced accordingly and a reaction in prices may result. Coal reserves in this district, however, range from 40 to 90 days.

We quote delivery in consumers yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$17.50 to $18.00
Cast iron car wheels	19.50 to 20.00
Relaying rails	20.00 to 25.00
Rolled or forged steel car wheels	17.00 to 17.50
Steel rails, rerolling	15.50 to 16.00
Steel rails, less than 3 ft	15.50 to 16.00
Heavy melting steel	15.00 to 15.50
Frogs, switches and guards cut apart	15.00 to 15.50
Shoveling steel	14.50 to 15.00
Low phos., heavy melting steel	17.00 to 17.50
Drop forge flashings	10.50 to 11.00
Hydraulic compressed sheet	12.00 to 12.50
Axle turnings	12.00 to 12.50
Per Net Ton	
Iron angles and splice bars	16.00 to 16.50
Steel angle bars	13.50 to 14.00
Iron arch bars and transoms	17.50 to 18.00
Iron car axles	22.00 to 22.50
Steel car axles	15.25 to 15.75
No. 1 busheling	11.00 to 11.50
No. 2 busheling	6.75 to 7.25
Cut forge	13.25 to 13.75
Pipes and flues	10.25 to 10.75
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	13.25 to 13.75
Steel knuckles and couplers	15.00 to 15.50
Coil springs	15.00 to 15.50
No. 1 machinery cast	15.50 to 16.00
No. 1 railroad cast	15.00 to 15.50
Low phos. punchings	15.00 to 15.50
Locomotive tires, smooth	13.00 to 13.50
Machine shop turnings	7.50 to 8.00
Cast borings	9.50 to 10.00
Stove plate	14.00 to 14.50
Grate bars	12.75 to 13.25
Brake shoes	12.50 to 13.00
Railroad malleable	15.00 to 15.50
Agricultural malleable	15.00 to 15.50

Refractories Accountants Meet

WASHINGTON, April 25.—Convening at the Washington Hotel yesterday, the Refractories Accountants Institute has been organized to set up standards as to costs, and a number of papers on the subject were read, which, with an address by Huston Thompson of the Federal Trade Commission, constituted the features of the meeting. New officers elected were G. W. Greenwood, United Refractories Co., Dunbar, Pa., chairman, and C. W. Jordan, Kier Fire Brick Co., Pittsburgh, secretary-treasurer. These two officers, with the following, form the board of directors elected, W. J. Westphalen, Laclede Christy Clay Products Co., St. Louis; A. Henderson, Evans & Howard Fire Brick Co., St. Louis; R. E. Byrne, Ashland Fire Brick Co., Ashland, Ky., and F. S. Dunlap, Standard Refractories Co., Claysburgh, Pa.

Brier Hill Stack Lighted

YOUNGSTOWN, OHIO, April 25.—The Brier Hill Steel Co. this afternoon lighted its second blast furnace and is fully protected on coal requirements for its operation over three months. The bulk of this coal was purchased in Kentucky and much of it is now on wheels.

The cost of a good grade of Kentucky coal available for coking averages $5 per ton delivered, increasing the cost of coke about $1.50 per ton. The additional iron output will be largely required by the company, but a moderate surplus will be available for merchant sale.

A Valley independent is seeking 500 tons of ferromanganese for delivery before May 15 and expects to place the tonnage at $65 or less, seaboard.

The Westinghouse Electric & Mfg. Co. has taken orders for four turbines and two condensers. The United Gas Improvement Co., Philadelphia, has placed a 20,000-kw. turbine and a 40,000 sq. ft. condenser for a new station at Norristown, N. J., while the Public Service Corporation of New Jersey has ordered a 20,000-kw. turbine for a station at Marion, N. J., and one of 12,000 kw. for a station at Burlington, N. J., and the Luzerne County Gas & Electric Light Co. placed a 20,000-kw. turbine and a jet condenser. This equipment, representing $1,000,000 worth of business, will be built at the company's South Philadelphia works at Essington and at the East Pittsburgh plant.

New York

NEW YORK, April 25.

Pig Iron.—The pig iron market has continued very strong and prices have again advanced, the move upward being fully $2 on eastern Pennsylvania and Buffalo irons. The minimum quotations are now $24 for No. 2 plain, eastern Pennsylvania, $24.50 for No. 2X and $25.50 for No. 1X. The minimum on Buffalo iron is $23 for No. 2 plain and $24 for No. 1X. Some southern iron has been selling at from $16 to $16.50 for No. 2 Birmingham, but the company which was quoting $16 has now withdrawn from the market and there is no southern iron available for less than $16.50. Charcoal iron has also advanced $2 and is quoted $24.50, Michigan furnace. A considerable tonnage of Alabama iron which was placed in storage at Providence, R. I., several years ago when prices were very much higher than they are now is being sold on the basis of $16.50, Birmingham, and buyers are given the privilege of buying direct from Providence or taking the iron in Alabama from the company which owns the iron at Providence. Scarcity continues, but there is no real famine as all dealers seem to be able to obtain iron when it is urgently needed.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$27.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.02
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	26.52
Buffalo, sil. 1.75 to 2.25	28.46
No. 2 Virginia, sil. 1.75 to 2.25	28.56

Ferroalloys.—The coke situation is having its effect on the manganese-iron alloy market. Domestic ferromanganese is somewhat difficult to obtain, and while demand is not large and is confined to lots running up to 500 tons, most of these have been taken by British sellers at $65, seaboard. Sales of 2000 to 2500 tons are reported. The American quotation of $70, seaboard basis, is more or less nominal and, so far as can be learned, has not been established by sales. Domestic spiegeleisen is not plentiful and quotations are largely nominal. It is interesting to note that one importer has already sold 500 tons of British spiegeleisen to American consumers at prices f.o.b. seaboard above those prevailing for the domestic alloy. There is no interest in manganese ore and quotations continue nominal. A very good business continues to be done in 50 per cent ferrosilicon with a tendency of prices to stiffen slightly. Demand for ferrochromium has also been fairly active at prevailing prices. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, seaboard, per ton	$70.00
Ferromanganese, British, seaboard, per ton	$65.00
Spiegeleisen, 16 to 19 per cent, furnace, per ton	$34.00
Spiegeleisen, 20 per cent	$35.00
Ferrosilicon, 50 per cent, delivered, per ton	$55.00 to $60.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$4.00

Ores

Manganese ore, foreign, per unit, seaboard	25c. to 26c.
Tungsten ore, per unit, in 60 per cent concentrates	$2.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3 crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3 crude, per net ton, Atlantic seaboard	$25.00 to $27.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	40c. to 45c.

Finished Iron and Steel.—Prices seem to be well held at 1.60c., Pittsburgh, for plain structural material and for bars, but it is still possible on anything like an attractive order to buy steel plates on a 1.50c. basis. For small lots 1.50c. has been done on universal plates. One large maker of shapes could add materially to bookings at 1.60c., but instead is choosing its business. Bars have been sold at 1.75c. where delivery has been important and the regular suppliers could not serve. The coal strike comes in for very little comment, though it is recognized that the ease with which business is placed with different mills depends almost wholly on the status of their coal supplies. The view among sellers, without reference to the coal strike, is generally that prices will be sustained through the summer, even though railroad buying and building activity do not continue at the present scale. The developments in these lines were not so great as in recent weeks, but the volume of buying is still encouraging. In fabricated steel work awards include the following:

Building at Broadway and Sixtieth Street, 250 tons, to the Paterson Bridge Co.

Greenville high school, Jersey City, 1900 tons, to the Fagan Iron Works.

Lehigh Valley Railroad, bridge work, 350 tons, to the American Bridge Co., and 250 tons to the Bethlehem Steel Bridge Corporation, in addition to amounts named last week.

Roosevelt Hospital, 800 tons, to the Levering & Garrigues Co.

Steel for the Edward Malley Co. store, New Haven, Conn., 800 tons, to the Levering & Garrigues Co.

Apartment for the Van Rensselaer Estate, Broadway and Ninety-first Street, 1500 tons, to the Paterson Bridge Co.

School, Corning, N. Y., 200 tons, to the Oltmer Iron Works, Jersey City.

Apartment, Bing & Bing, Lexington Avenue and Forty-sixth Street, 1800 tons, to the Belmont Iron Works.

Fresh structural steel projects include the following:

Chelsea bridge, Boston, for which the Holbrook, Cabot & Rollins Corporation is low bidder on the general contract and the Boston Bridge Works low bidder to the contractor on steel work.

Bridge repair work for the New York Central, 1100 tons, mostly in the Chicago district, for which the King Bridge Co. is low bidder, with the Bethlehem Steel Bridge Corporation low bidder for work in the Bronx district.

Insurance building, Goldsboro, N. C., involving four different schemes, with 1500 tons required if an all-steel structure is purchased.

High school, Scranton, Pa., 1000 tons.

Greenwich Savings Bank, 1500 tons, to Marc Eidlitz & Son.

For the bridge, crossing the Delaware at Camden, requiring perhaps as much as 40,000 tons of steel all told; work is expected to be in progress in the fall on the structural steel piers for the cables.

We quote for mill shipments, New York, as follows: Soft steel bars, plates and structural shapes, 1.88c. to 1.98c.; bar iron, 1.88c. On export shipments the freight rate is 28.5c. per 100 lb. and the domestic rate is 38c.

Warehouse Business.—Prices on iron and steel items in this district have been increased $2 per ton, following action taken by the leading warehouse interest. This represents an increase of 10c. per 100-lb. on iron and soft steel bars, shapes and plates, hoops and bands. Iron and steel bars are now quoted by most warehouses at 2.48c. per lb., with shapes and plates at 2.58c. per lb. Blue annealed sheets were increased at the same time to 3.38c. per lb., base. Hoops and bands, on which there was a divergence of price between the leading interest and other warehouses, are now quoted generally at 3.38c. and 2.98c. This action has been anticipated by jobbers for some time, as the spread between warehouse and mill was rapidly decreasing with the rise in mill quotations. The change, based upon bars at 1.50c. per lb. base, Pittsburgh, represents a return to a $12 per ton spread. Dealers in wrought iron and steel pipe report a continuance of price shading by some dealers, which renders the market somewhat unstable. Among brass and copper warehouses, brass sheets, wire and rods are off about ¼c. to ½c. per lb. Business continues fairly brisk. On the whole, the market for iron, steel and other materials out of warehouse has been good during April, but it is doubted by most jobbers that this month will prove as good a month as March.

Cast-Iron Pipe.—Activity in this field is intense, buying being about equally divided between private and municipal contracts. Municipalities are now satisfying requirements which have been in some instances delayed since prior to the war. It is unofficially reported that the City of New York still requires cast iron pipe totaling up to about 15,000 tons. A contract for 520 tons of 6-in. and 8-in. pipe has been awarded by the Department of Water Supply, Albany, N. Y., to the Warren Foundry & Machine Co., which has also received 2700 tons of 36-in. pipe from the Department of Water Supply, Schenectady, N. Y. Prices continue extremely stiff. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $48.80; 4-in. and 5-in., $53.50; 3-in., $63.80, with $4 additional for Class A and gas pipe.

High Speed Steel.—Sales are still small and the market inactive. Producers are quoting from 75c. to 80c. per lb. for 18 per cent tungsten high speed steel with special brands of some companies ranging up to 95c. per lb.

Coke.—Prices are higher and the usual quotation on foundry grades is $6.50 with almost as much being

asked for furnace coke. Prices of by-product coke have been advanced and are now being quoted at $8.50 seaboard with freight from Newark, N. J., of $1 on the Erie and Lackawanna, $1.68 on the Pennsylvania and $2.24 on the Central of New Jersey.

Old Material.—The upward trend in this market continues, but the high point seems to be $17.50 per ton Pittsburgh, at which price it is reported that the Jones & Laughlin Steel Co. closed last week for about 30,000 tons. While dealers shipping to Johnstown have been obtaining $14.50 and better per ton, the Cambria Steel Co. is now said to be out of the market. The present activity in buying by mills is attributed to the fact that the coal strike has necessitated a close conservation of pig iron, in order that as little coal as possible shall be consumed in blast furnaces, resulting in heavier charges of scrap and less pig iron used in the open hearth furnaces than usual.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$9.75 to $10.25
Steel rails, short lengths, or equivalent	10.50 to 11.00
Rerolling rails	10.50 to 11.00
Relaying rails, nominal	27.00 to 28.00
Steel car axles	11.25 to 11.75
Iron car axles	19.00 to 20.00
No. 1 railroad wrought	11.00 to 11.50
Wrought iron track	10.50 to 11.00
Forge fire	6.50 to 7.00
No. 1 yard wrought, long	10.50 to 11.00
Cast borings (clean)	7.00 to 7.50
Machine-shop turnings	6.50 to 7.00
Mixed borings and turnings	6.50 to 7.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.25 to 9.75
Stove plate	9.75 to 10.25
Locomotive grate bars	10.50 to 11.00
Malleable cast (railroad)	9.00 to 9.50
Cast-iron car wheels	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to $17.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.00 to 16.50
No. 1 heavy cast, not cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	11.00 to 11.50

Railroad Car and Locomotive Business

The Chesapeake & Ohio Railroad has placed 1500 double sheathed box cars and 200 stock cars with the American Car & Foundry Co., the box cars to be built in the Chicago district and the stock cars in the Huntington, W. Va., plant. This railroad is in the market for 68 passenger cars and is expected shortly to place orders for 1500 hopper bottom gondola cars and 1500 flat-bottom gondola cars, all of 57½ tons capacity.

The Chicago & Northwestern has placed 300 roger ballast cars with the American Car & Foundry Co. and is expected to close for the remainder of 2750 cars it has on inquiry before the close of the week.

The American Car & Foundry Co. has orders for 25 passenger service cars each from the Wabash and the Louisville & Nashville.

The Southern Pacific has placed 2000 50-ton automobile cars with the General American Car Co.

The Southern Railway is actively negotiating for 60 passenger equipment cars and 2000 box and 500 automobile cars. The Pennsylvania Equipment Co., Norwood, Pa., is in the market for 12 second-hand all-steel, 50-ton capacity flat-bottom gondola cars. The Wabash is inquiring for 500 all-steel coal cars.

The Alabama & Vicksburg has ordered three locomotives from the Baldwin Locomotive Works.

The Sharon Pressed Steel Co., Sharon, Pa., recently disposed of its plant at Ellwood City, Pa., to J. J. Dunn, J. W. Offutt, T. E. Moore and J. A. Gelbach, all of Ellwood City. To what use the plant will be put has not yet been divulged by the new owners, but an announcement is promised at a later date. All of the heavier equipment of the plant some time ago was shipped to the Sharon plant of the former owners and no machinery is included in the transfer of the building and land. The plant is a modern one with a large floor area, well lighted and equipped with electrical and power facilities. It also has good railroad connections. During the war the plant was extensively used in the production of hydraulic forgings and deep stampings.

Philadelphia

PHILADELPHIA, April 24.

Effects of the coal strike on the Eastern pig iron situation are more marked than last week. The Alburtis furnace of the Thomas Iron Co. used up its available supply of coke and went out of blast last Friday and the Oxford furnace of the Replogle Steel Co. will go out of blast this week. The Warwick and Brooke furnaces are short of coke and may find it necessary to bank at any time. Other furnaces are out of the market or selling in a very limited way, except the Bethlehem Steel Co., which has been the largest pig iron seller in the past week or two. Prices of pig iron are firm and show an advancing tendency. Small sales of foundry iron are being made at prices varying from $23.50 to $25, furnace, for No. 2 plain and from $24 to $25, furnace, for No. 2 X. High silicon iron, 3.25 to 3.75 per cent silicon, has brought as high as $28, furnace, in carload lots.

The steel situation is not in a serious condition and operations are increasing at some Eastern mills. Business is being offered in larger volume than the mills are willing to take. Prices are firmer, and it is more difficult this week to buy plates, shapes and bars below 1.60c., Pittsburgh.

Pig Iron.—Scarcity of blast furnace coke, due to the coal strike, is creating a more serious situation in pig iron. The Alburtis furnace of the Thomas Iron Co. used up its available store of coke and went out of blast last Friday and the Oxford furnace of the Replogle Steel Co. will go out of blast this week. The Warwick and Brooke furnaces are running from hand-to-mouth on coke and may be obliged to bank any day. The Replogle Steel Co. will blow in a Wharton furnace on May 15. Other Eastern merchant furnaces, with the exception of those of the Bethlehem Steel Co., are taking little or no business. Pressure for iron has become more insistent within the past few days. Consumers are urging shipments to fortify themselves against a possible shortage and there is considerable inquiry for carload lots for immediate delivery. Some large inquiries have also appeared, including one of 5000 to 10,000 tons of gray forge iron from the Reading Iron Co., one for about 3000 tons of foundry grades from a New Jersey consumer for May-June delivery and another for 1200 tons of foundry from a Delaware shipbuilding company. Prices are strong with a tendency toward further advances. One furnace interest is quoting $23.50 to $24, furnace, on No. 2 plain, $24 to $24.50, furnace, on No. 2 X and $25 on No. 1 X. Carload lots of foundry iron analyzing from 3.25 to 3.75 per cent silicon have been sold at prices varying from $26.50 to $28, furnace, high silicon iron being very hard to get. Two furnaces which have made limited sales within the past week, one of these having sold only from its stock pile, have gotten $25, furnace, for both No. 2 plain and No. 2 X. On 1000 tons of malleable iron the delivered price was about $25.50. Gray forge iron has been quoted at prices ranging from $23 to $24, furnace, while basic, for which there has been no demand during the week, is held by furnaces at $22.50 to $23, furnace. Eastern makers of copper bearing low phosphorus iron expect to advance the price from $28 to $30, furnace, this week. Substantial sales of Alabama iron, probably about 15,000 tons, have been made within the past two weeks to Virginia cast iron pipe companies at $16.50, Birmingham, plus a freight rate of $5.13, or $21.63, delivered. It is understood also that New Jersey cast iron pipe companies have bought Alabama iron, which at $16.50, Birmingham, can be shipped to Burlington and Florence, N. J., and other points along the Delaware, taking water competitive rates, for $7.07, making a delivered price of $23.57. The freight rate to Philadelphia is $8.67, bringing the delivered price of Alabama iron, 1.75 to 2.25 per cent silicon, to $25.17 here. If the price of pig iron continues to advance, the question of importing European iron will probably be seriously considered by consumers on the Atlantic seaboard. At present English or Belgian iron would cost about $27, delivered Philadelphia, for a grade equivalent to No. 2 X. It is recalled that during the coal

strike of 1902 about 1,000,000 tons of foreign pig iron was imported, but at present there is said to be no surplus of iron abroad, and it is doubted here that European iron will become such an important factor in the American market as it was in 1902.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$24.90 to $26.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	25.40 to 26.26
Virginia No. 2 plain, 1.75 to 2.25 sil.	$27.74 to 28.24
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 28.74
Basic delivery eastern Pa.	21.50 to 22.00
Gray forge	23.00 to 24.00
Malleable	25.50
Standard low phos. (f.o.b. furnace)	30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—British importers of ferromanganese continue to quote $65, Atlantic seaboard, but domestic producers are asking $70 to $72.50, the latter being the price of the Steel Corporation. Very little business is being done in either foreign or domestic alloy.

Semi-Finished Steel.—Very few transactions in billets are reported. Prices continue firm at $29.50, Pittsburgh, for rerolling quality and $34.50, Pittsburgh, for forging quality. On some inquiries 50c. a ton above these prices has been quoted.

Plates.—An increase in the volume of plate business is noted. The Coatesville works of the Midvale Steel & Ordnance Co., which was idle until just recently, is now operating at 25 per cent, a gain of about 5 per cent within two weeks, while the Lukens Steel Co. has been adding more open-hearth furnaces to its active list and this week is working its large mill on double turn for the first time in more than a year. While the bulk of the business booked is in comparatively small lots, some large tonnages are being figured on, including 30,000 to 40,000 tons for the 3000 freight cars on which the Chesapeake & Ohio Railroad is now receiving bids and 17,000 tons for gas tank work. There is also a lot of miscellaneous work, which aggregates a considerable tonnage. Altogether probably not less than 100,000 tons of plates have been put up to Eastern mills within the past week. The plate price is fairly firm at 1.60c., Pittsburgh, though all 1.50c. quotations have not disappeared, but it is more difficult to buy at the latter price. In some instances, 1.70c., Pittsburgh, has been paid for small lots.

Structural Material.—Bookings of structural shapes are increasing, and a good deal of business at 1.60c., Pittsburgh, has been put on the books within the past week, but many of the orders entered were on protections given at 1.50c. An Eastern mill has quoted 1.70c., Pittsburgh, on some small inquiries. The Bethlehem Steel Bridge Corporation will probably fabricate 7000 tons for two city piers, bids for which were opened last week. About 1500 to 2000 tons for the Hotel Sylvania, Philadelphia, is reported to have been awarded to the Lehigh Structural Steel Co. A very large volume of small work is being offered to the mills.

Bars.—More orders for steel bars are being offered than mills are willing to accept. Some companies are turning away business that is offered by consumers who are not their regular customers. The chief anxiety of the mills is to avoid increasing their obligations to a point that might prove embarrassing in the event of crippled operations, due to the coal situation, or higher prices. The Ford Motor Co. is asking for 2000 tons of steel bars. Eastern bar iron makers are quoting 1.50c., Pittsburgh, and are taking orders with a degree of caution even at this price.

Sheets.—Such sales of sheets as are being made are at the new level of prices, namely 2.40c. for blue annealed, 3.15c. for black and 4.15c. for galvanized, all base Pittsburgh. Sellers say that they now have no difficulty in getting these prices. Some mills have practically withdrawn from the market, their obligations for second quarter being all that they care to assume in view of the coal situation.

Bolts, Nuts and Spikes.—The new discounts on bolts and nuts, announced last week, are being firmly held to. Most consumers are protected on second quarter contracts entered at prices lower than those now prevailing. The Lenoir Car Works, affiliated with the Southern Railway, has closed for 1,500,000 bolts, of which there were close to 900,000 of one size, and about the same number of nuts. The Pennsylvania Railroad has inquired for 2500 kegs of spikes and 70,000 heat-treated track bolts, which is almost a duplicate of an order placed a few weeks ago. Railroad spikes are firmer and are now being quoted quite generally at 2.25c. per lb., Pittsburgh.

Warehouse Business.—Local warehouses have advanced all grades of sheets 15c. per 100 lb. in line with recent advances in mill prices. We quote various steel products for local delivery as follows:

Soft steel bars and small shapes, 2.36c.; iron bars (except bands), 2.36c.; round edge iron, 2.55c.; round edge steel, iron finish, 1½ x ½ in., 2.55c.; round edge steel planished, 3.30c.; tank steel plates, ¼-in. and heavier, 2.46c.; tank steel plates, 3/16-in., 2.61c.; blue annealed steel sheets, No. 10 gage, 3.40c.; black sheets, No. 28 gage, 4.15c.; galvanized sheets, No. 28 gage, 5.15c.; square twisted and deformed steel bars, 2.50c.; structural shapes, 2.46c.; diamond pattern plates, ¼-in., 4.35c.; 3/16-in., 4.50c.; spring steel, 3.50c.; round cold-rolled steel, 3c.; squares and hexagons, cold-rolled steel, 3.50c.; steel hoops, No. 13 gage and lighter, 3.11c.; steel bands, No. 12 gage to 3/16-in., inclusive, 2.86c.; iron bands, 3.90c.; rails, 2.36c.; tool steel, 8c.; Norway iron, 5.50c.; toe calk steel, 4.50c.

Coke.—Several hundred tons of by-product coke for foundry use have been sold in the past day or two at $8.25 ovens, or about $10.25 to $11.25 delivered. Bee hive coke is now very difficult to get.

Old Material.—The advance in prices of various grades of scrap continues, though largely because of a large demand in the Pittsburgh district. Sales in eastern Pennsylvania are increasing, however, and every sale takes prices another step higher. Heavy melting steel is quoted this week at $14.50 to $15, but local brokers believe it is headed toward $16. A few thousand tons of pipe was sold at $15, delivered. No. 1 forge fire, short shoveling turnings for blast furnace use and heavy axle turnings are higher on sales to consumers. A tonnage of heavy axle turnings has been sold at $13.25, delivered. The Lukens Steel Co. has bought 5000 tons of plates from Hog Island stocks. We quote for delivery to consumers in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$14.50 to $15.00
Scrap rails	14.50 to 15.00
Steel rails, rerolling	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	20.50 to 21.00
Cast iron car wheels	16.00 to 16.50
No. 1 railroad wrought	16.00 to 16.50
No. 1 yard wrought	15.00 to 15.50
No. 1 forge fire	12.00 to 12.50
Bundled sheets (for steel works)	12.00 to 12.50
No. 1 busheling	13.50 to 14.50
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	12.00 to 12.50
Mixed borings and turnings (for blast furnace use)	11.00 to 11.50
Machine-shop turnings (for rolling mill and steel works use)	12.00 to 12.50
Heavy axle turnings (or equivalent)	13.00 to 13.25
Cast borings (for steel works and rolling mills)	12.00 to 12.50
Cast borings (for chemical plants)	15.00 to 16.00
No. 1 cast	17.50 to 18.00
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	14.50 to 15.00
Railroad malleable	12.50 to 13.00
Wrought iron and soft steel pipes and tubes (new specifications)	14.25 to 15.00
Shafting	19.00 to 20.00

British Foundrymen Entertained

PITTSBURGH, April 25.—Oliver Stubbs, president of the Institution of British Foundrymen, and Thomas Firth, past president of that body, who are making a tour of the steel plants and foundries of the country, and who have been visiting this city, were entertained by the Pittsburgh Foundrymen's Association at the Duquesne Club here this evening. A. L. Humphrey, president Westinghouse Air Brake Co., was toastmaster and George McCandless, McConway & Torley Co., Pittsburgh, public safety director, represented the municipality and extended to the guests the greetings of the city. About 30 executives of foundries and steel companies in this district attended the dinner.

Cleveland

CLEVELAND, April 25.

Iron Ore.—The advance in pig iron prices makes the ore situation in respect to prices very uncertain, but the feeling is general that ore prices will be higher than they would have been had pig iron remained at recent levels. With pig iron prices now higher than during last June when ore prices were established last year, some sellers take the view that ore prices at the mines should be kept at the 1921 basis and that price reduction should be limited to whatever cut is made in carrying charges to the lower lake ports. When ore prices were made last year, basic pig iron was quoted at $21, Valley furnaces, but the market was weak and prices declined to $20.50 during the same week. Buyers and sellers are awaiting developments in the rate situation and it is not expected that ore prices will be named until a definite announcement is made regarding rates. There are reports that the upper lake rail rates will be reduced from 20c. to 35c. per ton, although it is not positively known that any reductions will be made. A reduction of 10c. a ton in vessel rates on ore is looked for. Shipments are being held off awaiting rate reductions. The first ore shipments will probably be made this week, as two cargoes, one for Cleveland and one for Buffalo, have been lined up for April shipment. One of the leading ore firms will load 40,000 tons of ore at the end of this month in order to make more room at stock piles, but beyond this has made no plans for shipping ore. The sale of 75,000 tons of Swedish ore is reported in the East. The Steel & Tube Co. of America resumed operations this week in its large Newport mine in the Gobebic range.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The market has continued active and prices have advanced about $1 per ton on foundry iron, $3 on basic and $1 on Bessemer. A Cleveland producer has sold 10,000 tons of basic iron for shipment from Cleveland to Massillon, Ohio, at $23 at furnace. A lot of about 27,000 tons of basic iron long in the hands of Cleveland brokers is being held for $25. Foundry iron is quoted by most sellers at $22 for shipment from lake or Valley furnaces, but one lake furnace is still adhering to $21 for round lots and booked 24,000 tons in foundry and malleable grades, mostly at that price, during the week. However, other producers have made small lot sales at $23. A Valley furnace sold two 100-ton lots of iron running 2.75 to 3.25 in silicon at $24. Many foundries have been buying pig iron in small lots, because of the danger of a scarcity owing to the coal strike, have come in the market for iron to cover the remainder of their second quarter requirements. This resulted in considerable business during the week in lots of from 500 to 2000 tons. One seller in this territory has commenced to take orders for foundry iron for the third quarter at $22 and during the week sold several lots aggregating 2000 tons for that delivery. The Westinghouse Electric & Mfg. Co. has withdrawn its inquiry for iron for the third quarter, having decided to take its chances with the market. Small lot sales of Bessemer iron are reported at $22 and several producers have withdrawn from the market. Low phosphorus iron is active and higher, one Valley interest selling several lots aggregating 2500 tons. A silicon differential has been re-established on this iron, low phosphorus iron running 1 to 2 per cent and silicon being quoted at $31 and the higher silicon at $32. With a 50c. advance by one producer, the Southern pig iron market is established at $16.50 and several sales in lots up to 300 tons are reported at that price for the second quarter. The same price is being quoted for the third quarter and a 500-ton lot for that delivery was placed by a Pittsburgh district sanitary interest. Ohio silvery iron has advanced another $1 per ton to $29.50 for 8 per cent silicon and several orders have been taken for that price. This same price is being quoted for the third quarter and a 600-ton lot sale was made for that delivery. The Otis Steel Co. has secured a supply of coal and plans to start up one of its blast furnaces about May 8.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$23.56
Northern No. 2 fdy., sil. 1.75 to 2.25	22.00
Southern fdy., sil. 1.75 to 2.25	23.13
Ohio silvery, sil. 8 per cent	32.86
Standard low phos., Valley furnace	31.00

Sheets and Light Plates.—There is a heavy demand for sheets and for plates in the lighter gage, particularly from the automobile field, and considerable sheet business has been taken at the recent $3 a ton price advance. A Valley mill has made a further advance of $7 a ton in sheet prices, but other mills have not followed in the advance. A Cleveland mill to-day advanced its price to 2c. for light plates, making No. 10 gage 2.40c.

Warehouse Business.—Cleveland warehouses have advanced prices $2 per ton on steel bars, hoops and bands and $3 a ton on plates, structural shapes and blue annealed sheets. Warehouse prices on shafting have been reduced $5 per ton. Warehouse orders are heavy, sales having about doubled over March.

Finished Material.—Many consumers are finding it difficult to secure steel shipments as needed as a result of the recent heavy buying and the withdrawal from the market of a number of independent mills because of the fuel situation. The leading interest continues to book orders, but is making no delivery promises and some of the mills are now several weeks behind in shipments. The volume of business continues fairly heavy. Many consumers in making recent purchases did not take into consideration the possibility of delayed deliveries and an increase in their requirements, due to better plant operations and consequently bought rather sparingly. Others delayed in sending in specifications and are now crowding the mills for orders for quick shipments. The leading interest is now quoting steel bars, plates and structural steel at 1.60c. for less than carloads, but is adhering to 1.50c. for larger lots. Some of the independent mills are still taking limited tonnages, mostly in steel bars at 1.60c. However, considerable plate business has been booked by Cleveland and Eastern mills at 1.75c. A Valley mill has advanced hot-strip steel to a 2.10c. minimum price. A new inquiry has come out for a freight boat requiring 4500 tons of plates and structural material. Ohio fabricators are figuring on a highway bridge at Omaha requiring 4000 tons of structural steel. An inquiry for 1300 tons of plates for stills for the Standard Oil Co. is still pending. Bids will be taken Wednesday for the Union Trust Building, Cleveland, requiring 600 tons of reinforcing bars and probably 800 tons of steel piling, the structural steel having previously been placed.

Jobbers quote steel bars, 2.31c.; plates and structural shapes, 2.41c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.21c.; hoops and bands, 2.81c.; cold-rolled rounds, 3c.; flats, squares and hexagons, 3.50c.

Semi-Finished Steel.—Prices on sheet bars have advanced to $33 on a sale of 2000 tons by a Cleveland producer. Some steel plants that have been sellers are now keeping all their semi-finished steel for their own requirements, so that it is not plentiful. One Valley mill is asking $35 for sheet bars, but that price has brought no orders.

Coke.—Sales of Connellsville foundry coke on track are reported at $6.50. Virginia foundry coke has advanced 50c., sales being made at $6. Indianapolis by-product foundry coke has also advanced 50c. to $8. Although foundries stocked up before the strike, many did not take into consideration increased foundry operations and consequently the demand for coke has become more active.

Bolts, Nuts and Rivets.—The demand for bolts and nuts continues active and the recent price advance is apparently being well maintained, as manufacturers report that all business taken during the week was at the new prices. The leading Cleveland rivet manufac-

turer, April 24 advanced prices $2 per ton to 2.20c. for structural and 2.30c. for boiler rivets in round lots. Small rivets have been marked up and various quotations are being made on these, ranging from 70 and 10 to 75 and 5 per cent off list.

Old Material.—The advance in pig iron prices has had a stiffening effect upon the scrap market and open-hearth scrap and several other grades have advanced 25c. to 50c. per ton. While quotations on some grades have not changed, it is expected that these will bring higher prices than have been quoted recently. Mills are buying only odd lots. There is some demand from dealers for heavy melting steel for Valley delivery to replace rejected material and purchases by dealers have been made at $16.25, which price is being offered for additional lots.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$14.00 to $14.25
Steel rails, under 3 ft.	14.25 to 14.50
Steel rails, rerolling	15.00 to 15.50
Iron rails	14.00 to 15.00
Iron car axles	18.00 to 19.00
Low phosphorus melting	15.00 to 15.25
Cast borings	11.00 to 11.25
Machine shop turnings	10.75 to 11.00
Mixed borings and short turnings	11.00 to 11.25
Compressed steel	11.25 to 11.75
Railroad wrought	14.00 to 14.50
Railroad malleable	15.00 to 15.50
Light bundled sheet stampings	9.00 to 10.00
Steel axle turnings	11.75 to 12.00
No. 1 cast	15.50 to 16.50
No. 1 busheling	10.00 to 10.50
Drop forge flashings over 10 in.	10.75 to 11.00
Drop forge flashings under 10 in.	11.00 to 11.25
Railroad grate bars	13.25 to 13.50
Stove plate	13.50 to 13.75
Pipes and flues	11.00 to 11.50

Boston

BOSTON, April 25.

Pig Iron.—Prices quoted by those eastern and western Pennsylvania, Virginia and Alabama furnaces with iron available have been advanced $1 to $2 a ton, but it is doubtful whether much iron has been taken in New England at the higher figures. The highest price reported paid for eastern Pennsylvania second quarter iron the past week is $23, furnace base, but the same iron to-day is $24 base. Carlots of eastern Pennsylvania spot iron sold at $26 to $28, furnace, for No. 2 X, but under circumstances that hardly justify the establishment of the market on any such basis. Western Pennsylvania iron sold at $22, furnace base, and to-day is $23. A small tonnage of Virginia high silicon sold at $22 furnace base, and more is available on that basis. Alabama iron stored in New England, early in the week sold on a basis of $16, furnace, later at $16.50, and subsequently at $17 and is on a $17 base to-day. No Buffalo foundry iron is reported sold, leading furnaces being out of the market and unwilling to quote any price. Northern malleable was sold, however, and at former prices, the largest transaction being 500 tons to a Massachusetts melter for storage purposes. The total sales for the past week approximate 10,000 tons, including malleable and regular foundry iron. Certain Pennsylvania furnaces will sell for third quarter delivery. Inquiries in the market to-day include 2250 tons No. 2 X and No. 1 X from a western Massachusetts foundry, part of which is covered; 400 tons malleable and 400 tons silicon 1.75 to 2.25 from the Crane Co., Bridgeport, Conn.; 750 to 1000 tons malleable from another Connecticut foundry; 500 tons malleable, last half delivery, from the Rhode Island Malleable Iron Co.; 200 tons No. 2 X, 200 tons high manganese Virginia and 200 tons No. 2 plain foundry iron from a New Hampshire foundry; and numerous smaller lots ranging from 200 tons down to car lots.

We quote delivered at common New England points as follows, having added to furnace prices $4.06 freight from eastern Pennsylvania, $5.46 from Buffalo, $6.58 from Virginia and $10.66 from Alabama:

East. Penn., sil. 2.25 to 2.75	$27.06 to $28.06
East. Penn., sil. 1.75 to 2.25	26.56 to 27.56
Buffalo, sil. 2.25 to 2.75	27.96
Buffalo, sil. 1.75 to 2.25	27.46
Alabama, sil. 2.25 to 2.75	27.66 to 28.16
Alabama, sil. 1.75 to 2.25	27.16 to 27.66
Virginia, sil. 2.25 to 2.75	29.08
Virginia, sil. 1.75 to 2.25	28.58

Warehouse Business.—Local warehouses are doing a fairly good business, especially in sheets and structural steel, but reports from other sections of New England are less encouraging, the textile strike situation having an adverse influence on the consumption of iron and steel. Jobbers now say there will be no advance on nails and other wire products just now.

Jobbers quote: Soft steel bars, $2.40½ per 100 lb. base; flats, $3.05½; concrete bars, $2.20 to $2.68; structural steel, $2.40½ to $2.50½; tire steel, $3.85 to $4.25; open-hearth spring steel, $4 to $5.50; crucible spring steel, $11.50; steel bands, $2.90½ to $3.53; hoop steel, $3.31½; cold rolled steel, $3 to $3.50; refined iron, $2.40½; best refined iron, $4.25; Wayne iron, $5.50; Norway iron, $5.50; plates, $2.65½ to $2.83; No. 10 blue annealed sheets, $3.63 per 100 lb. base; No. 28 black sheets, $4.65; No. 28 galvanized sheets, $5.65.

Coke.—The ratio of daily melt among New England foundries is slightly larger than on April 1, most of the improvement coming during the past week. Indications point to a still further improvement within the next fortnight. The consumption of foundry coke therefore is expanding and some foundries, that last week stated they had sufficient fuel on hand to last them through the second quarter, are less sure of their position to-day. This fact, together with the strength of Connellsville spot coke prices, makes for firmness here, but prices will not change until May 1, if then.

Old Material.—Anticipated buying of old material by Pennsylvania mills did not develop the past week, the market for heavy melting steel, borings and turnings, etc., generally being reported as practically at a standstill. A considerable tonnage of material is moving out of New England, but against old contracts. The increased interest shown by New England foundries in machinery cast has not continued, according to the important local sellers. Consumption of machinery cast presumably has not increased enough to prevent foundries supplying their requirements from local yards.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery	$18.00 to $18.50
No. 2 machinery	16.00 to 16.50
Stove plate	14.50 to 15.00
Railroad malleable	13.00 to 13.50
Car wheels	17.00 to 17.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	10.00 to 10.50
No. 1 railroad wrought	11.00 to 12.00
No. 1 yard wrought	10.00 to 10.50
Wrought pipe (1 in. in diam., over 2 ft. long)	8.00 to 8.50
Machine shop turnings	6.00 to 6.50
Cast iron borings, rolling mill	6.50 to 7.00
Cast iron borings, chemical	9.50 to 10.00
Blast furnace borings and turnings	6.00 to 6.50
Forged scrap and bundled skeleton	5.50 to 6.00
Street car axles and shafting	12.50 to 13.00
Rerolling rails	10.50 to 11.00

Buffalo

BUFFALO, April 24.

Pig Iron.—But one furnace is selling iron and this interest is now in position to take considerable business. For months the price situation was so unsatisfactory that most of the output of one stack was piled and with the announcement that the majority of competitors were out of the market, having sold up to the end of the second quarter, and a stiffening of prices, this producer became active and sold 5000 tons. Furnaces which withdrew several weeks ago have sold a few scattered lots to favored customers. Quotations of $24 on No. 2 plain have been frequent. Thousands of tons have been offered Buffalo makers but were turned down and a considerable portion of this inquiry is from brokers. In the few sales made, $23 was the price on No. 2 plain and the same figure on malleable. Furnace operation will not suffer, operators say, as present sources of coke supplies assure them continued ability to supply their needs. A rumor that one of two furnaces in operation by an interest which withdrew two weeks ago would be banked, brings the definite statement that both furnaces will continue in blast.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$24.00
No. 2X foundry, 2.25 to 2.75 sil.	23.50
No. 2 plain, 1.75 to 2.25 sil.	23.00
Basic	22.00
Malleable	23.00
Lake Superior charcoal	28.14

Finished Iron and Steel.—Prices of 1.60c. on bars, shapes and plates are quoted generally by those agencies still interested in booking business, with the exception of the Steel Corporation. On the basis of this price, considerable bar business has developed. Operation has not been subjected to any curtailment on account of the coal situation, but the general impression prevails that unless some relief is obtained, May will not close without some curtailment. Only one steel producer has diminished its operation and it is now running about 25 per cent. The first of the national companies having a branch here, to declare an embargo on orders, is getting little inquiry, the fact being generally understood that no change has occurred in the status of this producer. Efforts to place an order for 1700 tons of plates by a car maker were unavailing as late as Saturday, several sellers declining the business without reference to price. The Corrugated Bar Co. has taken 1760 tons of reinforced bars for the Rochester subway enterprise, reference to the fact, but not the tonnage being made in THE IRON AGE last week. The Kellogg Structural Steel Co. will fabricate 750 tons of shapes for the same job, and 100 tons for a public garage in Utica. Structural interests are indifferent to small jobs for the time being, the price situation not being regarded satisfactorily. An addition to a high school is a new prospect of interest here but the requirements are not yet known. Lackawanna Tubes, Ltd., has taken over the plant and business of the Welland Machine & Foundries, Ltd., Welland, Ont.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.65c.; plates, 2.65c.; soft steel bars, 2.55c.; hoops, 3.30c.; bands, 3.15c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.40c.; black sheets, No. 28, 4.40c.; cold-rolled strip steel, 5.80c.; cold-rolled round shafting, 3.35c.

Warehouse Business.—Withdrawal of a number of mills and notification by branches of national sales organizations having offices here, has greatly strengthened warehouse business. Prices have stiffened on several materials.

Old Material.—The majority of the large mills are disinterested in further purchases of heavy melting steel; first, because they have plenty of stock on hand for the present and the further belief that the coal strike will be long drawn out. Outside the district better prices are obtainable on this product; the market here is firm at $14.50 to $15.00. Outside a radius of 75 miles, buyers find it to their advantage to buy from Pittsburgh dealers though the price at that point and at Youngstown is greater than at Buffalo.

We quote dealers asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$14.50 to $15.00
Low phos., 0.04 and under	17.50 to 18.50
No. 1 railroad wrought	16.00 to 16.50
Car wheels	16.00 to 16.50
Machine shop turnings	10.00 to 10.50
Cast iron borings	10.50 to 11.50
Heavy axle turnings	12.50 to 13.00
Grate bars	12.00 to 13.00
No. 1 busheling	12.00 to 12.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	9.00 to 10.00
No. 1 machinery cast	17.50 to 18.50
Hydraulic compressed	12.50 to 13.50
Railroad malleable	13.50 to 14.50

Bridgeport Plants Gain in Activity

The Manufacturers' Association of Bridgeport, Conn., reports a gain of 2.2 per cent in activity among 31 manufacturing plants of that district for the week ended April 8, compared with the preceding week, as gaged by man hours. There was no appreciable gain in the number of employees, now 55.5 per cent of normal, but the men are engaged in a greater number of hours work per week, the average now being 47.2 hr.

Buys Birmingham Company

BIRMINGHAM, ALA., April 24.—The Virginia Iron & Bridge Co., Roanoke and Memphis, has purchased the property of the bankrupt Birmingham Steel Corporation, maker of structural steel, at the Federal Court sale for $148,000. The purchaser, through its president, C. E. Michael, said the plant would also be adapted to manufacture and repair of freight cars.

Cincinnati

CINCINNATI, April 25.

Pig Iron.—Increased activity in the pig iron market last week was reported by virtually all sellers, and some fair tonnages were booked. Prices advanced in all markets, with the exception of Chicago, from 50c. to $1 a ton. Southern iron is now quoted on a $16.50, Birmingham, basis, and this price has been established for third quarter by sales of 2000 and 3000 tons respectively to Cincinnati district melters. Early in the week, Southern iron was quoted at $16 by one interest, but now all furnaces are quoting $16.50 for both prompt and third quarter delivery. Among other sales reported was one of 600 tons of Southern to a nearby melter, one of 500 to a central Ohio melter, and one of 300 to a Dayton melter. On Northern iron, a sale of 1000 tons of foundry was made to a central Ohio melter early in the week at $21, Ironton basis, and one of 500 tons of malleable to a northern Ohio melter at the same price. Late in the week, southern Ohio furnaces increased their prices to $22, and we note sales of 300 and 100 tons at this figure. There is some inquiry out, one being for 1300 tons of foundry from northern Ohio, one of 500 tons from Indiana and one of 1200 tons for a Southern melter. Jackson County furnaces are reported to be out of lower grades of silvery irons, and have raised prices another dollar on silvery and Bessemer ferrosilicons. Northern charcoal iron has also been advanced, and is quoted to-day at $24, furnace. The report of the Ohio State Foundrymen's Association for March showed an average operation of 40 per cent, as against 33 per cent in February.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$21.00
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	21.50
Ohio silvery, 8 per cent sil	32.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.52
Basic Northern	23.52
Malleable	24.52

Finished Material.—Orders for finished material during the week continued to show improvement, most of them, however, being for small tonnages. The policy of the mills in having all orders submitted before acceptance has put a check on the desire of buyers to place orders for other than nearby delivery. Prices are very firm and while 1.50c. can still be done on bars, shapes and plates, sales are being made by practically all independent mills at 1.60c., and some small orders were booked during the week at 1.70c. The sheet market continues active and some buyers are asking to be taken care of for third quarter, but to date mills have not signified their intention of accepting orders for other than second quarter shipment. Some independent mills are refusing business on account of the uncertainty of the coal situation and are only taking orders subject to their ability to roll materials from billets now in stock. While there is still a fair business in wire products, the demand is not so keen as has been the case recently. Nails are still quoted at $2.40 to $2.50 with most of the business being done at the former price. Semi-finished material is very much in demand and the market is at least $2 higher than two weeks ago, but mills are inclined to go slowly in advancing prices. In the structural field there were no awards of consequence made in this district, but a number of new projects have come up. A central Ohio fabricator is understood to have taken 1000 tons for a cement plant at Sandusky, Ohio, and the Leibold-Farrell Building Co., Cincinnati, has been awarded the general contract for a ten-story office building in that city. Bridge work for the Lake Erie and Western, involving 50 tons, was awarded to the King Bridge Co. New projects include an addition to the Provident Bank Building, Cincinnati, requiring 800 tons of steel and a ten-story building for the Atlas National Bank Building, Cincinnati. A parcel post building for the U. S. Government at Cincinnati is also up for bids. This structure will take about 200 tons of structural steel and 500 tons of reinforcing bars. A northern Ohio mill will furnish 800 tons of bars for the Business Men's Club at Cincinnati. Local fabricators have received inquiries for two 6,000,000

cubic feet gas holders from Los Angeles, and San Diego, Cal., each holder taking approximately 2000 tons of plates and shapes. The Tennessee Central Railroad has not closed on its inquiry for 7000 tons of rails, but it is expected that this business will be placed with a Birmingham mill. Plant operations will not change during the week, the schedules of last week continuing in effect.

Warehouse Business.—Local jobbers report business improving rapidly, and during the week some fair sized orders were placed for immediate shipment. Bars and shapes were in particularly good demand and some orders were also placed for cold-rolled steel. Jobbers in wire products report a fair movement of nails. It is expected that some price advances will be made shortly to take care of advances recently made by the mills.

Iron and steel bars, 2.60c. base; hoops and bands, 3.20c. base; shapes and plates, 2.70c. base; reinforcing bars, 2.67½c. base; cold rolled rounds, 3.35c. base; flats, squares and hexagons, 3.85c. base; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; common wire nails, $2.75 per keg base; No. 9 annealed wire, $2.60 per 100 lb.

Coke.—There is a fair demand for coke, and prices are slowly advancing. Connellsville coke has been quoted as high as $7, but no sales are reported at this figure. Wise County foundry coke is up 25c. a ton, being quoted at $5.25. New River foundry is unchanged at $7.50, and by-product remains at $6, Connellsville basis.

Old Material.—The scrap market is, if anything, stronger, but the Cincinnati district is quiet. Blast furnace scrap is moving in fair quantities, however, and the demand from other districts is keeping prices steady. With consumption increasing, dealers are looking forward to greatly increased demand shortly. Prices are firm but unchanged.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton	
Bundled sheets	$6.00 to $6.50
Iron rails	13.00 to 13.50
Relaying rails, 50 lb. and up	26.00 to 26.50
Rerolling steel rails	11.50 to 12.00
Heavy melting steel	11.00 to 11.50
Steel rails for melting	11.00 to 11.50
Car wheels	13.50 to 14.00
Per Net Ton	
No. 1 railroad wrought	10.50 to 11.00
Cast borings	5.50 to 6.00
Steel turnings	4.00 to 4.50
Railroad cast	13.50 to 14.00
No. 1 machinery	15.50 to 16.00
Burnt scrap	9.00 to 9.50
Iron axles	17.50 to 18.00
Locomotive tires (smooth inside)	10.50 to 11.00
Pipes and flues	5.00 to 5.50

Birmingham

BIRMINGHAM, ALA., April 24.

The week ending April 22 closed with the conviction in the minds of all iron makers that a $17 market was imminent. One single stack operator sold what was left of second quarter capacity at $17 and got out of the market. Another maker operating one stack, but with others in reserve, went out of the market after selling the remainder of second quarter capacity at $16.50, and intends holding off for $17 or over. A third maker sold several thousand tons at $16.50 into third quarter and turned down second quarter business because it had not the grades. Bookings for third quarter were made by a large interest at $16 during week, but at close he was also on $16.50 firm for third quarter and expected a $17 base. Some consumers were talking about getting iron at $16 toward the close of the week, but it is believed this talk was without substance. Makers heavily booked turned down orders for 3000 and even 6000 tons, which probably went to others with larger capacity. There was a flood of inquiry all the week and a large tonnage was booked. One maker has booked 135,000 tons since and during March. A feature of market is that 75 per cent of the bookings has been by pipe makers. Large machinery makers and other consumers, late in recuperation of activities, are still to come. The Republic Iron & Steel Co. resumed at a second stack at Thomas this week. Vanderbilt stack of the Woodward Iron Co. will be making iron by May 1. This company will then have four active stacks, but one may possibly be on basic, of which a large tonnage has been placed for Western delivery. Alabama by May 1 will have 18 active stacks compared with nine Jan. 1. If Vanderbilt stack goes on basic, there will be nine stacks on basic and nine on foundry.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$16.50
Basic	15.50
Charcoal, warm blast	30.00

Finishing Mills.—Steel production of the Tennessee company remained at 100 per cent this week with the rail mill on turn of 10,000 tons and the structural mill completing its third week of continuous operation. The Gulf States Steel Co. is operating two of its six open hearths and is operating all finishing mills on a good turn. The same conditions are reported at American Steel & Wire Co.'s Fairfield plant, which is shipping products down the Warrior River in barges to Mobile for transshipment in barges to Galveston warehouses.

Cast Iron Pipe.—High pressure pipe shops are averaging an approach to full turn. It is understood that deals for lease of rights to make pipe by the De Lavaud process between the United States Cast Iron Pipe & Foundry Co. and others have been practically closed. The former company will be making this pipe in a few weeks. The base of high pressure pipe is firm at $34.50. The Iron City Pipe & Foundry Co. shipped two cars of sanitary pipe via Key West to Cuba last week. The base of $40 is firm. Some shops are on full turn.

Coal and Coke.—Coke is in active demand and spot coke has been selling at $5.25. Coal production is normal and there is no mine trouble.

Old Material.—Cast scrap is scarce and active. Large yards will not accept the base of $10.50 offered by large consumers for No. 1 steel and this constitutes a kind of deadlock. Freight rates prevent local dealers from getting far afield.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$13.00 to $14.00
No. 1 steel	12.00 to 13.00
No. 1 cast	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	11.00 to 12.00
Stove plate	12.00 to 13.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	4.00 to 5.00

St. Louis

ST. LOUIS, April 25.

Pig Iron.—The market for pig iron continues active, although sales for the last week were not so heavy as the previous week. The market for Northern iron has advanced $22, Chicago, which has been followed by the local makers, while Southern iron has advanced to $16.50 to $17, Birmingham, the lower price being quoted by a Sheffield maker, who is selling for both all rail and water and rail shipment on that basis. The market is firm on both Northern and Southern iron, and a scarcity is reported in some quarters. The biggest sale of the week was of 1000 tons of basic to a local melter. A Kansas City concern is in the market for 1000 tons of foundry iron. An Iowa melter wants 700 tons of foundry iron. The Enterprise Stove Foundry in Belleville is in the market for 500 to 600 tons of Southern iron. The business of the jobbing foundries is showing considerable increase, and they have inquiries out totalling 400 to 500 tons. The business of the stove plants is improving, and the various steel plants are steadily increasing their output.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$23.80
Northern malleable, sil. 1.75 to 2.25	23.80
Basic	23.80
Southern foundry, all rail, sil. 1.75 to 2.25	$21.74 to 22.74
Southern foundry, water and rail, sil. 1.75 to 2.25, f.o.b. St. Louis	20.74

Ferroalloys.—An inquiry for 300 tons of spiegeleisen reported in THE IRON AGE last week has been closed. The market is strong at an advance of $6 a ton, the present market being $46.48 delivered St. Louis.

Finished Iron and Steel.—The building situation is gradually clearing up. The sheet metal workers have agreed to a 20 per cent wage reduction from the $1.25 an hour base, making the eighth union that has agreed to a cut, while the carpenters agreed to arbitration. Of chief interest in the structural line is the 2,500 tons structurals involved in the Cahokia plant of the Union Electric Light & Power Co. Interest is being shown here in the Washington Gladden High School at Columbus, Ohio, involving 500 tons of structural steel. No new inquiries of consequence emanated from the purchasing agents of railroads this week. The American Refrigerator Transit Co. placed an order with the American Car & Foundry Co. for repairs on 200 refrigerator cars and with the Missouri Pacific for repairs on 100 cars. The Mobile & Ohio, through the Southern Railway, has purchased 10 locomotives.

For stock out of warehouse we quote: Soft steel bars, 2.37½c. per lb.; iron bars, 2.37½c.; structural shapes, 2.47½c.; tank plates, 2.47½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.25c.; structural rivets, $3.09½ per 100 lb.; boiler rivets, $3.19½; tank rivets, 7/16-in. and smaller, 65 and 5 per cent off list; machine bolts, large, 60-10 per cent; small, 60, 10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 65-5 per cent; hot pressed nuts, square or hexagon blank, $4; and tapped, $3.75 off list.

Coke.—The demand for foundry coke is more active. The jobbing foundries are buying more for immediate use, and some contracts are being placed for the latter part of the year. The situation in the Connellsville district is very much upset as a result of the miners' strike, and some of the plants have been forced to close, which, with a better demand, greatly strengthens the market. The best grades of Connellsville coke are selling at $6 to $7.

Old Material.—The market for old material continues very strong. Added to a better demand for old material here and elsewhere by consumers, there is keen competition among dealers, which is helping to shoot the prices up. Railroad lists are bringing good prices, in some instances 50c. to $1 more than the material would bring at the moment. This condition has existed for several weeks. The advances in the price of pig iron and of finished steel products are also factors in boosting the price of old material. Heavy purchases were made during the week by the American Car & Foundry Co. and the Commonwealth Steel Co. Operations among big consumers are steadily increasing. The estimated percentages of capacity to which the plants are now being operated follow: Scullin Steel Co., 50 per cent; National Enameling Co., 40 per cent; American Steel Foundries, 80 per cent; Commonwealth Steel Co., 75 per cent. Railroad lists before the market this week follow: Wabash, 600 tons; Atchison, Topeka & Santa Fe, 4600 tons; New York Central, open list.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers yards, as follows:

Per Gross Ton

Old iron rails	$16.75 to $17.25
Steel rails, rerolling	15.00 to 15.50
Steel rails, less than 3 ft	14.00 to 14.50
Relaying rails, standard section	25.00 to 30.00
Cast iron car wheels	17.00 to 18.00
No. 1 railroad heavy melting steel	13.50 to 14.00
No. 1 heavy shoveling steel	12.75 to 13.25
Frogs, switches and guards, cut apart	14.00 to 14.50

Per Net Ton

Heavy axle and tire turnings	8.50 to 9.00
Steel angle bars	12.50 to 13.00
Iron car axles	21.50 to 22.00
Steel car axles	15.50 to 16.00
Wrought iron arch bars and transoms	17.75 to 18.25
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.50 to 12.00
Railroad springs	14.00 to 14.50
Steel couplers and knuckles	14.00 to 14.50
Cast iron borings	8.50 to 9.00
No. 1 busheling	10.25 to 10.75
No. 1 railroad cast	15.50 to 16.00
Stove plate and light cast	13.00 to 13.50
Railroad malleable	11.75 to 12.25
Pipe and flues	8.00 to 8.50
Machine shop turnings	7.00 to 7.50

STEEL CORPORATION EARNINGS

Marked Improvement in March—George K. Leet Is Elected Secretary

The report of the United States Steel Corporation earnings for the first quarter of 1922 is in striking contrast with that for the last quarter of 1921. In the last three months of last year, the earnings declined from $8,204,358 in October to $4,967,237 in December. There was a further decline in January of this year to $4,654,134 and then the upward movement started, the net earnings for February being $6,180,685 and for March $8,505,166, but the gain in the latter part of the quarter was not sufficient to make the earnings larger than those of the last quarter of 1921, the figures being $19,612,033 for the last quarter of 1921 and $19,339,985 for the first quarter of 1922. The deficit for the first quarter of this year was $6,749,468, compared with $5,280,901 for the last quarter of 1921. The usual dividends of 1¾ on preferred and 1¼ on common were declared. The earnings for the past quarter and for the three preceding years were as follows:

Quarters	1922	1921	1920	1919
First	$19,339,985	$32,286,722	$42,089,019	$33,513,384
Second		21,892,016	43,155,705	34,331,301
Third		18,918,058	48,051,540	40,177,232
Fourth		19,612,033	43,877,862	35,791,302
Net earnings each year		$92,708,827	$177,174,126	$143,813,219

Earnings for First Quarter, 1922

	Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding	Less: Interest on the Subsidiary Companies' Bonds Outstanding	Balance of Earnings
January, 1922	$5,310,382	$656,248	$4,654,134
February, 1922	6,837,643	656,958	6,180,685
March, 1922	9,155,607	650,441	8,505,166
	$21,303,632	$1,963,647	
Net earnings			$19,339,985
Less charges and allowances for depreciation, and sinking funds			8,364,289
Net income			$10,975,696
Deduct: Interest for the quarter on U. S. Steel Corporation bonds		$4,866,464	
Premium on bonds redeemed		200,000	
			5,066,464
Balance			$5,909,232
Dividends on stocks of the United States Steel Corporation, viz.:			
Preferred, 1¾ per cent		$6,304,919	
Common, 1¼ per cent		6,353,781	
			12,658,700
Deficit			$6,749,468

Election of Officers

At the meeting of the directors held Tuesday afternoon, the old officers were re-elected with the exception of Richard Trimble, long secretary and treasurer, who has been unable to discharge the duties of his office for the past 15 months on account of ill health. George K. Leet, for the past 11 years private secretary to Judge Gary, was elected secretary of the Corporation, and Fred M. Waterman, assistant treasurer and acting treasurer since the long illness and the death of Thomas Murray, was elected treasurer. Gordon Edwards and John Gewecke of the treasurer's office were elected assistants to the treasurer and Gordon Edwards and Francis J. Jester were elected assistants to the secretary. W. J. Filbert, comptroller, was elected to fill the vacancy on the finance committee caused by the death of George W. Perkins. W. P. Palmer, Cleveland, president of the American Steel & Wire Co. since its organization, was elected a director to fill the vacancy caused by the death of Thomas Murray. E. J. Buffington, president of the Illinois Steel Co., who was elected a director at the annual meeting, has also been the president of that subsidiary company since its organization.

The Jones & Laughlin Steel Co. has finally taken title to 1000 acres at Hammond, Ind., on which it secured an option some time ago. All of the conditions upon which the transfer was contingent were compiled with by the seller and with the formal payment of $750,000 to the Newport Land Co., the property passed into the hands of the Jones & Laughlin Company. A steel plant will be constructed on the tract.

Machinery Trade Meeting at Birmingham

BIRMINGHAM, April 25.—Attendance at the joint conventions of the American Supply and Machinery Manufacturers and the Southern Supply and Machinery Dealers Associations, held in the Tutwiler Hotel, are largely attended and an air of optimism mixed with conservatism pervades.

The first open joint session was addressed by W. H. Kettig, chairman of the board of the Sixth Federal Reserve Bank, who succinctly outlined its operations. He advocated an amendment to the Reserve Bank law that would enable the entire bank resources of the country to come into the Federal Reserve system. C. H. Houston, Assistant Secretary of Commerce, outlined the closer relations existing between that department and trade associations at this time and extended a cordial invitation for closer relations, declaring that the latchstring of his office was on the outside so far as business interests of the world are concerned.

Dixon C. Williams, Chicago, read a paper on war effects, in which he declared that business would have rehabilitated itself much sooner had a league of nations followed immediately on the heels of the armistice. He declared it would be a year of survival of the fittest. Congress was raked over the coals for obeying the behests of group organizations.

At the morning session Col. Peter C. Knight, Tampa, general counsel for the Southern Hardware Association, delivered an address in which he deplored the spirit resulting in the adoption of the last four amendments to the Constitution. He said the income tax was wrong because the taxes were not levied equally. He roundly condemned the primary system of electing United States Senators who, he declared, had voted the soldier bonus bill knowing it was wrong because afraid of the electors. Referring to the coal strike, Colonel Knight said: "If the Government will limit itself to its proper functions and the coal operators have the nerve we believe they have, when this strike is settled, it will be the last strike of coal miners we will ever have."

Demand for Refractories Curtailed

PITTSBURGH, April 24.—As had been expected, curtailment of blast furnaces and steel works activities incident to the walkout of the coal miners in the non-union fields, has affected somewhat the demand for refractories. This decline in business is more marked in the Pittsburgh and Youngstown districts than it is in the Central West or in the East, where the fuel situation does not seem to have become as serious as is true in the steel-making centers referred to. In the Pittsburgh and nearby districts about ten blast furnaces have been banked or blown out and there also has been some loss of steel works activities. This has resulted in the holding up of shipping instruction on orders for refractories, but a large amount of business is in sight and the impression prevails that once the fuel situation clears up, business will recover sharply. Refractories manufacturers are not affected by the coal miners strike, as those owning their own mines have succeeded in keeping the men at work, and those who buy coal stocked liberally against a shortage incident to the mine suspensions. There has been no special change in prices.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$32.00 to $35.00	$30.00 to $32.00
Ohio	30.00 to 35.00	28.00 to 30.00
Kentucky	32.00 to 35.00	30.00 to 32.00
Illinois	32.00 to 35.00	30.00 to 32.00
Missouri	32.00 to 35.00	28.00 to 32.00
Silica Brick		
Pennsylvania		30.00
Chicago	35.00 to	37.00
Birmingham		40.00
Magnesite Brick		
Standard size per net ton (f.o.b. Baltimore)		53.00
Grain magnesite per net ton (f.o.b. Baltimore)		28.00
Chrome Brick		
Standard size, per net ton	40.00 to	42.00

New York Steel Treaters April Meeting

The April meeting of the New York Chapter of the American Society for Steel Treating, held in the assembly room of the Merchants Association of New York, Woolworth Building, Tuesday evening, April 25, was addressed by Prof. H. F. Moore of the University of Illinois, who delivered an illustrated lecture on the "Fatigue of Metals." Professor Moore is well known as an authority on this question because of his direction of the research on this subject, conducted under the direction of the National Research Council.

W. H. Eisenman, national secretary, was present in the course of a visit to various chapters. He announced that the American Drop Forge Association would hold its annual convention at Detroit, Oct. 2 to 7, at the same time and place as the American Society for Steel Treating.

Announcement was also made of an invitation to steel treaters of the eastern chapters by the New Departure Ball Bearing Co., to visit its plant at Bristol, Conn., Saturday, April 29. About 300 are expected to attend. They will inspect the large heat-treating department, and after a luncheon there will be a special program of speeches and discussions.

Col. Charles R. Gow, president Associated Industries of Massachusetts, was the guest of the New England Iron and Hardware Association at a meeting held Tuesday evening, April 18, at Young's Hotel, Boston. Col. Gow was in charge of the erection of the Government base at South Boston during the war, which was constructed in record breaking time. At the association meeting, he was introduced by Fred L. Avery president. The subject of his talk was Some Economic Aspects of To-day's General Industrial Situation.

COMING MEETINGS

April

Society of Industrial Engineers. April 26 to 28. Spring meeting, Hotel Statler, Detroit. George C. Dent, business manager, 327 South La Salle Street, Chicago.

American Electrochemical Society. April 27 to 29. Spring meeting, Baltimore. Acting secretary, Dr. Conlin G. Fink, 101 Park Avenue, New York.

May

Iron and Steel Institute. May 4 and 5. Annual Meeting. Quarters of Institution of Civil Engineers, London, England. Secretary, George C. Lloyd, 28 Victoria Street, S. W., London.

The National Supply and Machinery Dealers' Association. May 8, 9 and 10. Seventeenth annual convention. Marlborough-Blenheim Hotel, Atlantic City. Secretary, T. James Fernley, 505 Arch Street, Philadelphia.

American Society of Mechanical Engineers. May 8 to 10. Spring meeting, Atlanta, Ga. Secretary, Calvin W. Rice, 29 West Thirty-ninth Street, New York.

National Association of Manufacturers. May 8, 9 and 10. Annual Convention. Waldorf-Astoria Hotel, New York. General offices, 50 Church Street, New York.

National Foreign Trade Council. May 10 to 12. Convention Hall, Philadelphia. Secretary, O. K. Davis, 1 Hanover Square, New York.

National Sheet Metal Contractors' Association. May 15 to 19. Convention and exposition, Cadle Tabernacle, Indianapolis.

National Association of Purchasing Agents. May 15 to 20. Annual convention and exposition. Exposition Park, Rochester, N. Y. Secretary, H. R. Heydon, 19 Park Place, New York.

American Iron, Steel & Heavy Hardware Association.. May 23 to 25. Annual meeting, Hotel Washington, Washington. Secretary, A. H. Chamberlain, Marbridge Building, New York.

American Society for Steel Treating. May 25 and 26. Sectional meeting, Pittsburgh. Secretary, W. H. Eiseman, 4600 Prospect Avenue, Cleveland.

American Iron and Steel Institute. May 26. Spring meeting, Hotel Commodore, New York. Acting Secretary, H. H. Cook, 61 Broadway, New York.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.36	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.35	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.405	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Memphis	0.43
Cincinnati	0.325	Jacksonville, all rail	0.555
Indianapolis	0.345	Jacksonville, rail and water	0.46
Chicago	0.38	New Orleans	0.57
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.60c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.60c.

Wire Products

Wire nails, $2.40 to $2.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.25; galvanized wire, $2.75; galvanized barbed wire, $3.05 to $3.15; galvanized fence staples, $3.05 to $3.15; painted barbed wire, $2.55 to $2.65; polished fence staples, $2.55 to $2.65; cement-coated nails, per count keg, $1.90 to $2; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 70½ per cent off list for carload lots; 69¼ per cent for 1000-rod lots, and 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 65, 10, 10 and 5 per cent off list
Machine bolts, small, cut threads, 65, 10 and 5 per cent off list
Machine bolts, larger and longer, 65, 10 and 5 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 65, 10 and 5 per cent off list
Cut threads, 65 and 5 per cent off list
Longer and larger sizes, 65 and 5 per cent off list
Lag bolts, 65, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads, 60 and 10 to 60 per cent off list
Other style heads, 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter, 65 per cent off list
Larger and longer sizes, 65 per cent off list
Hot pressed square or hex. blank nuts, $5.25 off list
Hot pressed nuts, tapped, $5.25 off list
C.p.c. and t. sq. or hex. nuts, blank, $5.00 off list
C.p.c. and t. sq. or hex. nuts, tapped, $5.00 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S., 80, 10 and 10 per cent off list
Small sizes, S. A. E., 80 and 3 tens to 80 and 2 tens per cent off list
⅝ in. to 2 in. inclusive, U. S. S., 80 per cent off list
Stove bolts in packages, 80, 10 and 5 per cent off list
Stove bolts in bulk, 80, 10, 10 5 and 2½ per cent off list
Tire bolts, 65, 10 and 5 per cent off list
Track bolts in carloads, 3c. to 3.50c. base
Track bolts, less than 200 kegs, 3.50c. to 4c. extra

Upset Square and Hex. Head Cap Screws

½ in. and under, 80 and 10 to 80, 10 and 10 per cent off list
9/16 in. to ¾ in., 80 and 10 to 80, 10 and 10 per cent off list

Upset Set Screws

½ in. and under, 80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in., 80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes, 75 and 10 to 80 per cent off list

Milled Set Screws

All sizes, 70, 10 and 10 per cent off list

Rivets

Large structural and ship rivets, $2.20 to $2.25
Large boiler rivets, 2.30 to 2.35
Small rivets, 70 and 10 to 75 and 5 off list

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $38; chain rods, $38; screw stock rods, $43; rivet and bolt rods and other rods of that character, $38; high carbon rods, $45 to $48, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.15 to $2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.50 base; 5/16-in., $2.50 base. Boat and barge spikes, $2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3 to $3.50 base per 100 lb. Tie plates, $1.75 per 100 lb. Angle bars, $2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $9.30 per package; 8-lb. coating, I. C., $9.60; 15-lb. coating, I. C., $11.80; 20-lb. coating, I. C., $13; 25-lb. coating, I. C., $14.25; 30-lb. coating, I. C., $15.25; 35-lb. coating, I. C., $16.25; 40-lb. coating, I. C., $17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.60c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	60	33½	½	36½	18½
½	65	50½	¾	42½	27½
¾	69	56½	1 to 1½	44½	29½
1 to 3	71	58½			

Lap Weld

2	64	51½	2	39½	25½
2½ to 6	68	55½	2½ to 6	42½	29½
7 to 8	65	51½	7 to 12	40½	27½
9 to 12	64	50½			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	56	38½	½	35½	23½
½	62	50½	¾	42½	28½
¾	67	55½	1 to 1½	44½	30½
1 to 1½	69	57½			
2 to 3	70	58½			

Lap Weld, extra strong, plain ends

2	62	50½	2	40½	27½
2½ to 4	66	54½	2½ to 4	43½	31½
4½ to 6	65	53½	4½ to 6	42½	30½
7 to 8	61	47½	7 to 8	35½	23½
9 to 12	55	41½	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

To large buyers of steel tubes, a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn or hot-rolled tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	63	2½ and 2¾ in.	46
1¼ and 1½ in.	55	3 in.	50
1¾ in.	36	3¼ to 4 in.	55
2 and 2¼ in.	42	4¼ in. to 5 in.	47

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.35	Nos. 13 and 14	2.50
Nos. 9 and 10 (base)	2.40	Nos. 15 and 16	2.60
Nos. 11 and 12	2.45		

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.95	No. 28 (base)	3.15
Nos. 22 to 24	3.00	No. 29	3.25
Nos. 25 and 26	3.05	No. 30	3.35
No. 27	3.10		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.15	Nos. 25 and 26	3.85
Nos. 12 to 14	3.25	No. 27	4.00
Nos. 15 and 16	3.40	No. 28 (base)	4.15
Nos. 17 to 21	3.55	No. 29	4.40
Nos. 22 to 24	3.70	No. 30	4.65

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.95	No. 28 (base)	3.15
Nos. 17 to 21	3.00	No. 29	3.20
Nos. 22 to 24	3.05	No. 30	3.20
Nos. 25 to 27	3.10	Nos. 30½ and 31	3.25

JAPANESE RAILROADS ACTIVE

South Manchuria Railway Again Buys — More Transmission Towers Awarded—Chinese Market Dull

NEW YORK, April 22.—There is but little change in the export situation. Trade with Japan continues active and the new $10 per ton ocean freight set by conference seems to be holding firm, although there are still enough commitments at the old rate, held by some exporters, to permit shipments to be made at better than $10. The recent events in the Chinese political situation may curtail even what small trade now exists with China. While there is some small buying from this market of nails, sheets and pipe, spinning and flour mill machinery is easily more important among recent purchases. In nails, one exporter to Far Eastern markets recently booked an order for 1000 kegs to China and has shipped 2800 kegs to Manila, P. I. This same export company has, however, in the past month sold five flour mills and two units of textile machinery.

Japanese purchases continue varied. There is some buying of bars and black sheets, and a fair number of inquiries for railroad material, largely from private sources. Lately the South Manchuria Railway Co. has been particularly active and some business will evidently come to the United States from this buyer, despite the recent placing of its rail order in Germany. The latest inquiry, bids on which were opened April 24, called for 500,000 locknut washers for 100-lb. rails, 30,000 for 80-lb. rails, 200,000 spikes for 100-lb. rails and 350,000 splice bars for 80-lb. rails. There is also an inquiry out from this railroad for locomotive boiler tubes.

Takata & Co., 50 Church Street, New York, have obtained the remainder of the transmission towers for the Taiwan Hydro-Electric Power Co., Formosa. The approximate tonnage of all towers for this project is 8000 tons. They are being installed in connection with the large power station on the island of Formosa for carrying transmission lines from the main plant to Keehing in the north, about 100 miles, and to Takao in the South, about 125 miles. The towers will all be fabricated by the American Bridge Co. In addition to this contract, Takata & Co. has received the order for about 3000 tons of transmission towers to be used in extending the existing power facilities of the Daido Denrioku.

It is reported by the American Trade Commissioner in Buenos Ayres, Argentina, that a direct preference, which has resulted in recent contracts being awarded to American fabricators, has been shown for American fabricated steel, despite the high price. Government officials are apparently not satisfied with the workmanship on continental material and the result has been a number of good bridge contracts for American sellers.

British Iron and Steel Market

Business Hampered By the Labor Disputes Still Raging—Continental Quotations

(By Cable)

LONDON, ENGLAND, April 25.

Labor disputes are still unsettled. An extension of the lockout in the engineering industry is feared. The amalgamated engineering union is preparing for a three months' struggle.

Resumption of pig iron business is slow. Industrial unrest is suppressing home orders. Exports are fairly brisk; April shipments are expected to show an increase over March. Increased output of Cleveland pig iron is not yet warranted, however. Prices are unchanged. Hematite is easier on diminished demand. East Coast mixed numbers have been sold at £4 16s. ($21.22).

Foreign ore is firmer. Bizerta is being sold at 24½s. ($5.41) ex-ship Tees. Sellers of Bilbao Rubio ask 27s. ($5.97) ex-ship Tees.

There is a fair export inquiry for finished steel, but few makers are willing to accept the low prices necessary. Many large works remained closed last week (after having been closed for the Easter holiday) and it is uncertain when they will reopen, having no accumulation of specifications. The total iron and steel shipments for March amounted to 295,820 tons.

Continental material is quiet. French beams have been sold at £7. 5s. (1.43c. per lb.) but the general quotation is up to £7 15s. (1.53c. per lb.) f.o.b., May delivery. Continental quotations are covered in the table.

Tin plate is quieter after the holiday, but prices are firm. Prompt sellers are held at 20s. ($4.42) basis f.o.b. Forward buyers are paying 19⅜s. ($4.28) f.o.b. General export buying includes Germany, Portugal and Canada. Wasters are firmer, 28 x 20-in. costing buyers 36s. ($7.95) f.o.b.

Galvanized sheets are steady, but business is slow.

Japanese specifications for black sheets are quoted up to £16 (3.16c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.42 per £1, as follows:

Durham coke, delivered	£1	8s.		to £1	8½s.	$6.19	to	$6.30
Cleveland No. 1 foundry	4	15				21.00		
Cleveland No. 3 foundry	4	10				19.89		
Cleveland No. 4 foundry	4	7½				19.34		
Cleveland No. 4 forge..	4	2½	to	4	5	18.23	to	18.79
Cleveland basic	4	10				19.89		
East Coast mixed.....	4	16	to	5	0	21.22	to	22.10
Ferromanganese	15	0	&	14	10*	66.30	&	64.09*
Rails, 60 lb. and up....	8	0	to	9	10	35.36	to	41.99
Billets	7	10	to	8	0	33.15	to	35.36
Sheet and tin plate bars, Welsh	7	7½				32.60		
Tin plates, base box...	0	19½	to	0	20	4.20	to	4.42
						C. per Lb.		
Ship plates	9	5	to	10	10	1.83	to	2.07
Boiler plates	13	10	to	14	0	2.66	to	2.76
Tees	9	10	to	11	0	1.88	to	2.17
Channels	8	15	to	10	5	1.73	to	2.02
Beams	8	10	to	10	0	1.68	to	1.97
Round bars, ¾ to 3 in.	10	10				2.07		
Galvanized sheets, 24 g.	16	0	to	16	5	3.16	to	3.21
Black sheets	12	10	to	12	15	2.47	to	2.52
Steel hoops	12	0	&	12	5*	2.37	&	2.42*
Cold rolled steel strip, 20 g.	23	10				4.64		
Cotton ties, Indian specifications	15	0				2.96		

*Export price.

Continental Prices, All F.O.B., Delivery as Specified

No. 3 foundry pig iron:								
Belgium, May.....	£4	17½s.	to	£5	0s.	$21.55	to	$22.10
Luxemburg, May....	4	17½	to	5	0	21.55	to	22.10
France, May.....	5	10				24.31		
Merchant bars:						C. per Lb.		
Belgium, May, June..	8	0	to	8	10	1.59	to	1.68
Luxemburg, June....	8	0	to	8	12½	1.59		
Germany, June, July	8	0	to	8	10	1.59	to	1.68
France, May June...	8	0	to	8	10	1.59	to	1.68
Joists (beams):								
France, May.....	7	5	to	7	15	1.43	to	1.53
3/16-In. plates:								
Germany, June.....	8	7½	to	8	15	1.65	to	1.73
¼-In. sheets:								
Belgium, May, June..	10	0				1.97		
16-Gage sheets:								
Belgium, May, June..	11	10				2.27		

An experiment, new in American railroad practice, is being conducted by the Big Four Railroad which is running freight locomotives from St. Louis to Cleveland, a distance of 552 miles, without change. The tests, which have now been carried on for over a week, have proved successful, according to officials of the road, and it is the intention to continue these long runs on certain classes of freight indefinitely.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
April	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
19.....	12.87½	12.62½	30.62½	5.15	4.95	5.25	4.90
20.....	12.87½	12.50	31.00	5.20	5.00	5.27½	4.92½
21.....	12.87½	12.62½	31.62½	5.25	5.10	5.30	4.95
22.....	12.87½	12.62½	....	5.30	5.15	5.30	4.95
24.....	12.87½	12.62½	31.12½	5.40	5.20	5.35	5.00
25.....	13.00	12.75	31.12½	5.40	5.20	5.35	5.00

*Refinery quotation.

New York

NEW YORK, April 25.

The markets are strong and the price tendency is higher. Demand for copper has improved and the price is slowly advancing. The tin market has been quiet but prices are firm. The lead market is very strong with prices going higher almost daily. Demand for zinc is better and quotations have also advanced.

Copper.—Demand for both domestic and foreign consumption has been more active thus far this week than in some time. One or two prominent sellers report active inquiry from several of their largest customers, the delivery involved being principally May and June. The result has been the practical disappearance of the quotation of 12.87½c., delivered, which has prevailed for two or three weeks, so that the market is virtually on a 13c., delivered, basis to-day, or 12.75c., refinery. Fairly large sales have been made thus far this week by several of the leading sellers. The feature of the market is the continued active demand from foreign countries, despite financial conditions prevailing there.

Tin.—The market for the past week has been very quiet and exceedingly dull with only one day on which any substantial sales were made. This was Thursday, April 20, when about 250 tons, mostly future shipment, was purchased by dealers; nearby delivery was involved and sales were made at 30.87½c. to 31.12½c. Consumers at present show little interest. The American Smelting & Refining Co. has started up its Perth Amboy electrolytic refining plant and is taking orders for May delivery. About 50 tons of Straits tin for future shipment was sold on the New York Metal Exchange at 31.62½c. to 31.75c. Quotations for spot Standard tin have hovered close to 31c. most of the week with the price to-day at 31.12½c., New York. To-day's market was more active. The London market has been highly speculative, having advanced late last week several pounds, but it reacted again yesterday and to-day to £151 10s. for spot standard, £153 for future standard and £154 for spot Straits, or about £1 per ton below quotations of a week ago. Arrivals thus far this month have been 3310 tons with 5125 tons reported afloat.

Lead.—This market continues to grow stronger with the metal becoming scarce. The feature of the market to-day is that no independent sellers appear to have any metal to spare for prompt, April or May delivery. A producer in the West, however, has a stock which was mined and smelted at a high cost which he is holding and which may be put on the market when a new dollar can be obtained for an old one. Independent sellers practically control the market and the leading interest has been following their prices by making two advances in the past week, one on April 20 to 5.10c., New York, and one late yesterday to 5.25c., New York. In the outside market, however, 5.40c., New York, was the lowest price yesterday, some sellers asking up to 5.50c. To-day prices in this market range from 5.37½c. to 5.50c. and are largely nominal. It is expected that present conditions will start up some of the mines, but there is some fear expressed that before that happens prices may advance too high.

Zinc.—The market has again turned strong and prices have advanced gradually until to-day prime Western for early, or 30-day, delivery is quoted at 5c., St. Louis, or 5.35c., New York. While the improvement in demand has not been widespread, it has been sufficient to cause the present strength, which has also been due to the conservative attitude of sellers. Another factor has been an advance in the price of ore.

Antimony.—Wholesale lots for early delivery are quoted at 5c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted by the leading interest at 19c. to 19.10c., f.o.b. plant, with importers offering the same grade at about 17.50c. to 18c., New York, duty paid.

Old Metals.—The market is strong and inquiry is good. Values have not changed much though the holders are firm. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	11.50
Copper, light and bottoms	9.50
Heavy machine composition	9.50
Brass, heavy	7.00
Brass, light	5.75
No. 1 red brass or composition turnings	8.00
No. 1 yellow rod brass turnings	6.25
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Chicago

APRIL 25—Lead and zinc have advanced and, while there has been some buying of these metals, prices have gone up more than the amount of business placed would seem to warrant. Copper is quiet and tin has been fluctuating from day to day with the present price the same as that quoted a week ago. In the old metals lead and zinc have advanced in sympathy with the virgin material. We quote in carload lots: Lake copper, 13.25 to 13.50c.; tin, 32.75c.; lead, 5.30c.; spelter, 5.15c.; antimony, 7c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 8c.; red brass, 7.50c.; yellow brass, 6c.; lead pipe, 4c.; zinc, 2.75c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 25c.; all buying prices for less than carload lots.

St. Louis

APRIL 25—Lead for the week was strong, advancing 20 to 30 points, due to the advance of the American Smelting & Refining Co. Slab zinc was firm and up 10 points. We quote lead at 5c. to 5.10c., carlots and slab zinc at 4.90c. to 5c. On old material we quote: light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

To Discuss Three Power Test Codes

At the spring meeting in Atlanta of the American Society of Mechanical Engineers, a public hearing is set for May 9 for the discussion of three power test codes, on definitions and values, displacement compressors and blowers and hydraulic power plants. Though these codes have passed through six successive revisions in reaching their present form, a full and frank discussion will be welcomed. Reprints of all three codes, revised to date, may be obtained by addressing C. B. LePage, 29 West Thirty-ninth Street, New York.

Manganese Ore in Wales

It is reported that a promising prospect for manganese ore has been discovered, and is being opened, in the Culloden district of Wales. So far the work has not gone to a sufficient depth to demonstrate the commercial importance of the deposit, but it is believed from preliminary observations that the supply will be of considerable importance to the steel-making centers in that part of the United Kingdom.

PERSONAL

Jay L. Hench, district sales manager at Chicago for the Lackawanna Steel Co., Lackawanna, N. Y., has resigned to engage in other business, effective May 1. His successor is Randolph Payson, who has spent several years in both the operating and sales departments of the Lackawanna company. Mr. Payson is a graduate of the Sheffield Scientific School of Yale University.

M. D. Ebbets, of the Sloan Valve Co., Chicago, has been appointed Boston representative of the company, and will have headquarters at 43 Tremont Building, Boston, from which he will cover the territory in Maine, New Hampshire, Vermont and in eastern Massachusetts. Mr. Ebbets was formerly with the New York office of the company.

Walter H. Wiard, who for some time has been in charge of the school for foremen at the Waukegan, Ill., plant of the American Steel & Wire Co., has been appointed assistant superintendent of the DeKalb, Ill., works of that company.

C. M. Hall, formerly in charge of the New York territory for the Dodge Transmission Co., has become associated with the Black & Decker Mfg. Co., Baltimore, Md., and will have the territory including Indiana, Kentucky and the corner of Ohio which includes Cincinnati and Dayton. His headquarters will be in Indianapolis.

Malcolm Grant, whose former experience has been largely in efficiency and time study work in automotive factories, has joined the Black & Decker organization in a selling capacity, and will have the State of Ohio, except the corner which includes Cincinnati and Dayton. Headquarters will be at the Black & Decker branch office, 2030 East Twenty-second Street, Cleveland.

John N. Weir, assistant superintendent, Eliza furnaces, Jones & Laughlin Steel Co., has resigned to accept the position of superintendent of blast furnaces for the Pittsburgh Crucible Steel Co., Midland, Pa. Mr. Weir, who has been with the Jones & Laughlin Steel Co. for the past ten years, succeeds Harry H. Hodgett, resigned.

E. S. Griffiths, for a long time prominently identified with the metal working industry in Cleveland, has resigned as president of the Bishop & Babcock Co., Cleveland, owing to poor health. Howard Yeomans has been elected president and F. R. Pleasanton, vice-president and general manager. Mr. Griffiths was for a long time head of the Cleveland Machine & Mfg. Co., Cleveland.

A number of changes in the personnel of the United Alloy Steel Corporation, Canton, Ohio, were made at the annual meeting held April 18. E. A. Langenbach was elected president, succeeding Harry R. Jones, who recently resigned, and was also re-elected chairman of the board. John McConnell, who recently returned to the company, and Elton Hoyt, of Pickands, Mather & Co., Cleveland, were elected directors, succeeding E. L. Hang and J. A. Buell. George H. Charls was elected vice-president and general manager. C. W. Kreig was elected vice-president, secretary and treasurer succeeding Mr. Hang as treasurer. Mr. McConnell was elected vice-president in charge of operations.

Henry P. Rankin, at one time connected with the Pittsburgh Crucible Steel Co., Pittsburgh, as superintendent of construction and later in charge of the bar mill at Midland, Pa., who for the past few years has been Pittsburgh district manager for the Johns-Manville Co., has been made manager for the latter company in the Cleveland and Pittsburgh districts, with headquarters in Cleveland.

E. M. Wagner, the Reineke-Wagner Pump & Supply Co., Pittsburgh, is president of the recently organized Manufacturers Club of Pittsburgh, which has purchased the Hotel Chatham, Pittsburgh, for its home.

L. D. Perry will sever his connection with the Central Iron & Steel Co., Harrisburg, Pa., on April 30. He went to the company in 1913 as comptroller for the receivers, and served as a member of the operating committee until the termination of the receivership in 1917. For the past five years he has been secretary and treasurer of the company and has handled the affairs of its subsidiary the Connellsville Basin Coke Co., with mines and ovens in West Virginia. Mr. Perry expects to give his attention to other companies in which he is interested, and will continue to reside in Harrisburg.

Morris Metcalf, formerly president of the International Steel Corporation, which has been in process of liquidation for sometime, has become vice-president of Henry A. Hitner's Sons Co., Philadelphia, dealer in iron, steel and metals, and at present engaged rather extensively in buying and scrapping naval and Shipping Board vessels.

Alvin E. Huckins was elected president and general manager of the Burr Co., engineers, founders and machinists, Champaign, Ill., to fill the vacancy caused by the death on April 3 of the president, Ellis M. Burr. Other officers elected include Manford Savage, vice-president; N. G. Burr, treasurer; and W. S. Redhed, secretary.

Ralph Barstow, general sales manager of the Greenfield Tap & Die Corporation, Greenfield, Mass., has resigned his position with that firm to go into business for himself as merchandising counsellor in association with Marquis Regan, Inc., at 21 East 40th Street, New York City.

Frank L. Eidmann, mechanical engineer for the Barrett-Cravens Co., industrial hoists, trucks and tractors, Chicago, sails early in May for a six months' business trip through Europe.

Edward T. McNulty, who has been superintendent of the Yorkville, Ohio, works, Wheeling Steel Corporation, since its construction, has resigned to become general manager of the Charcoal Iron Products Co., recently organized, which will take over and operate the Griffiths Charcoal Iron Mills, Washington, Pa.

F. E. Weddell, who recently disposed of his interest in the Consolidated Coke Co. and affiliated companies, has re-entered the coal and coke business, having become associated with the Producers Coke Co., Uniontown, Pa., of which he recently was elected vice-president and a director.

W. E. Cusack has been appointed by Seggerman Bros., Inc., exporters and importers, New York, to represent the steel and chemical departments in Japan.

J. G. Miller, connected for six years with Reed, Fears & Miller, Inc., New York, Philadelphia and Boston, pig iron merchants, and for four years president, will, on May 1 retire from that corporation. Mr. Miller will devote his time to personal affairs. R. E. Blazo, secretary, will assume the management of the corporation's Philadelphia offices in the Stock Exchange Building, on May 1. Mr. Blazo has been associated with the Boston office several years. L. H. Miller, who was one of the original members of the corporation, remains with it, having offices at 30 Church Street, New York.

Arthur P. Clark has been advanced to the position of sales manager of the Corrugated Bar Co., Buffalo. Mr. Clark entered the service of the company in 1906, and prior to taking his present position was assistant sales manager.

Edward Blake, Jr., has been appointed vice-president in charge of sales for the Greenfield Tap & Die Corporation, Greenfield, Mass., with headquarters in Greenfield. For some time Mr. Blake managed the Lincoln Twist Drill plant, and prior to that was sales manager of the Wells Brothers Co., both concerns being members of the corporation.

B. F. Jones, third, and Leslie I. Laughlin were elected directors of the Jones & Laughlin Steel Co., at the annual meeting of the stockholders, April 25.

The address of W. D. Rearwin, maker of the bench type die-filing machines described on page 1004 of THE IRON AGE of April 13, is 716 Monroe Avenue, Grand Rapids, Mich.

OBITUARY

ROBERT H. ILLINGWORTH, who had been active in the steel industry for the past 44 years, died April 23 at his home in Newark, N. J. Until April 1 of this year, when he resigned his office, he was vice-president and a director of the Crucible Steel Co. of America. Mr. Illingworth, who was born in Springfield, N. J., would have been 61 years old had he lived until June 20. His early education was obtained in England, the native country of his parents, but as a young man he returned to the United States and attended Mt. Pleasant Military Academy at Ossining, N. Y., from which he was graduated.

R H. ILLINGWORTH

Mr. Illingworth's first activity in the steel business was at the plant of James R. Thompson & Co., in Jersey City, N. J., which was later abandoned and the company dissolved. About 1890 John and Benjamin Illingworth, uncles of Robert Illingworth, established John Illingworth & Co. in Harrison, N. J., which, in 1891, consolidated with Benjamin Atha & Co., under the name of the Benjamin Atha & Illingworth Co. At this time Mr. Illingworth was appointed superintendent of the plant, later becoming general manager. When the company was taken over by the Crucible Steel Co. of America in 1900, he remained as general manager until about three years ago, when he was elected vice-president of the Crucible company. He contributed to the progress of steel making by the changes of mixtures for various purposes, which he was instrumental in making in the production of high-grade steels, and was known in the industry as one of the pioneers in the production of high-grade alloy steels. He was also looked to as an expert on the problems involved in the manufacture of armor-piercing shells and gun forgings. Mr. Illingworth was a member of the American Iron and Steel Institute.

CHARLES THOMPSON, president the Herbrand Co., forgings, tools, etc., Fremont, Ohio, died April 15.

JOHN LAUSON, founder and president John Lauson Mfg. Co., New Holstein, Wis., manufacturing tractors, farm tools, and conducting a jobbing foundry and machine shop, died April 15 in a Milwaukee hospital following an operation. He was 54 years of age, having established the nucleus of the present large Lauson industry by opening a small machine and gas engine shop when he was 19 years old.

H. E. RICE, manager Dominion Steel & Iron Co., Sydney, N. S., died April 16 in New York, following an operation, in his fifty-sixth year. For many years Mr. Rice was connected with the Washburn & Moen Mfg. Co., Worcester, Mass. Later he was manager Waukegan Works American Steel & Wire Co., directing the rebuilding of the plant following its destruction by fire. He then was associated with the Washburn Wire Co., Providence, R. I. During the past 19 years he was manager of the Dominion Iron & Steel Co.

SQUIRE ROBINSON, inventor of the Robinson wrench, which was manufactured by the Peck, Stow & Wilcox Co. when it entered the wrench business, died in Southington, Conn., Sunday, April 16, in his eighty-fifth year.

ELLIS W. BURR, president The Burr Co., engineers, founders, machinists, Champaign, Ill., died April 3.

F. R. SCHNEIDER, who was general superintendent of the Superior Steel Co., Pittsburgh, prior to its reorganization as the Superior Steel Corporation, in 1916, died at his home in Crafton, Pa., April 21. He was 65 years old.

LEROY S. STARRETT, founder and president, the L. S. Starrett Co., machinists' tools, etc., Athol, Mass., died of pneumonia April 23, at St. Petersburg, Fla.

WILLIAM A. GREAVES, SR., machine tool manufacturer of Cincinnati, died in that city on April 18. Mr. Greaves, who was born in Cincinnati 60 years ago, was a son of Thomas Greaves, former superintendent of the Lomas Forge & Bridge Works. In 1889, in association with H. H. Klusman, Mr. Greaves organized the firm of Greaves-Klusman & Co., lathe manufacturers. Several years ago Mr. Greaves retired from this firm and with his three sons, organized the Greaves Machine Tool Co., Cincinnati, of which he was president. He is survived by his widow and three sons, William Allen, Jr., William Howard, and George B. Greaves.

The 48-Hour Week in Germany

A Dutch committee of inquiry, which recently investigated the question of the length of the working day in Germany, has come to the conclusion that the great majority of German workmen do not work more, but rather less, than 48 hr. per week, says the London *Iron and Coal Trades Review*. In connection with this a German paper draws attention to an inquiry conducted by the General Federation of German Trade Unions, the results of which are published in the Federation's official organ. The ascertainments made apply to 22 typical trades in 29 districts. According to the figures, of 1,389,413 workmen, 589,394 worked the maximum period of 48 hr. weekly, while over 800,000 worked for less than 48 hr. Thus, for instance, 216,354 miners worked only 42 hr. per week. The Federation draws attention to the fact that the 8-hr. day is not only fixed by government order, but has also been embodied in the wages' agreements. Overtime is worked chiefly when there are no agreements with the trade unions, and forms the exception and not the rule.

Basic Slag as Manure

Speaking at a recent meeting of the Bedfordshire Chamber of Agriculture (British) on "Artificial Manures," Dr. E. J. Russell (principal of the experimental station at Rothamsted) said that the consumption of basic slag had very nearly doubled since 1914. The greater part of the basic slag produced to-day was from open-hearth furnaces and not nearly so good as that produced in the Bessemer process, which gave 40 per cent of phosphates. The open-hearth basic slag yielded only 15 to 30 per cent of phosphates. Some of it was of the same solubility, and gave proportionate results, but the fluorspar slag produced to-day was much less soluble, was slower in action, and not so efficient. The Ministry of Agriculture has appointed a committee of steel and agricultural experts, of which Dr. Russell is chairman, to study the question.

Active Demand for Scrap

YOUNGSTOWN, April 25.—Melters are purchasing scrap metals in sizable tonnages owing to pig iron shortage and prices are consequently very firm. A Pittsburgh independent is reported to have contracted for 15,000 tons of scrap and to have paid from $17.50 to $17.75 for heavy melting. This represents an advance of from 25c. to 50c. from previous sales. In the Valley, steel plants are fairly well supplied with old material, having purchased heavily prior to the last advance.

In face of increased steel production, current iron output is inadequate for requirements of steel departments. Basic iron has been sold at $23, which compares with a minimum of $18 at the time the coal strike started.

Coke Output Less; Little Unionizing

(*Continued from page* 1161)

sentiment among the older employees at many of the mines in favor of returning to work. The next step may be the offering of protection to such workers, starting up a mine here and there to determine the attitude of the majority of the workers, and possibly the eviction of the agitators and those who refuse to go to work.

It is interesting to study the strike situation in this region, as it is the strangest ever seen here. Go out among the men themselves and ask them what they are striking for. They can't or will not tell you. Ask them if they haven't been satisfied with conditions in the region and they'll tell you yes. Attend the miners' mass meetings and there is some, but little, enthusiasm. They refuse to enter into any prolonged discussion of the strike. The striking miners do not seem to take the situation seriously. So far, business has been only slightly affected.

Following the strike in the early eighteen-nineties, repeated efforts have been made to organize the Connellsville region. The Frick company always has fought this organization and has been supported by its men. Efforts were made during the war but the organizers made no progress. The miners at the plants themselves saw to that.

Now the change in attitude is a strange one, mainly due perhaps to the fact that the principal leaders in the organization of the men at the plants in the region are young men. There are few older employees taking an active part in the organization efforts. Whether they have been threatened, intimidated or cajoled against returning is not established, but many have told plant officials that they are afraid to go back to their places in the mines.

Coal Production Equal to Demand

WASHINGTON, April 24.—Telegraphic reports to the Geological Survey for the last week (April 17-22) indicate no change in anthracite and a further decrease in the output of soft coal. From the following table of cars loaded daily it will be seen that the observance as holidays of Easter Monday and of Tuesday curtailed production sharply. By Wednesday and Thursday, however, daily loading had risen to over 11,000 cars, about the same as on the corresponding days of the two weeks preceding.

First Week, April 3-8	
Monday	11,445
Tuesday	11,019
Wednesday	11,437
Thursday	11,090
Friday	11,296
Saturday	8,888
6 Days	65,175
Second Week, April 10-15	
Monday	10,772
Tuesday	10,658
Wednesday	10,961
Thursday	11,482
Good Friday	10,714
Saturday	8,501
6 Days	63,088
Third Week, April 17-20	
Easter Monday	7,917
Tuesday	9,967
Wednesday	11,053
Thursday	11,040
4 Days	39,977

Lack of demand remains the limiting factor in most of the non-union fields. During the week a number of additional non-union mines were closed by the strike, but from those districts as yet unaffected reports of "No market" continue to be received. The number of loaded cars unconsigned at the mines is still large, though now decreasing. More coal could be produced if the demand increased.

Consumption is being met largely from storage. At the present rate of output the draft upon consumers' stock piles is not less than 4,000,000 tons a week.

The most conspicuous feature of tabulated returns received by the Survey, as they relate to operating conditions at soft coal mines in the first week of the strike, is the loss of working time ascribed to "no market" which appears in the reports from all of the non-union fields. The car supply has been almost perfect, but due to lack of demand, practically no non-union district was working at capacity. The mine reports thus confirm the evidence of spot prices and of accumulated unbilled coal that consumers are not buying enough to call out full production at those mines which are ready to work.

Wheeling Corporation Not Seriously Disturbed

WHEELING, W. VA., April 24.—Announcement in the daily papers that the Wheeling plants of the Wheeling Steel & Iron Co. (Wheeling Steel Corporation) had been shut down for an indefinite period because of the shortage of coal, is without foundation. Officials of the company state that the steel works at Benwood, W. Va., which suspended Saturday, will be down until about May 1, but that this action is in no wise ascribable to the fuel situation. Steel producing capacity at this plant considerably exceeds finishing capacity and having accumulated a considerable tonnage of steel, it was decided merely to shut off production until the skelp mills and pipe furnaces could use some of the accumulation.

The fuel situation has not seriously disturbed the Wheeling Steel Corporation as a whole, the plant operations generally have been expanding for several weeks past. The company is operating at a good rate at Portsmouth, Steubenville and Yorkville, Ohio, and last week started up the Creek mill, one of the Whitaker-Glessner units, located in the southern portion of the city. This plant had been down for several months, and like the other works of the company is being operated on the open-shop basis. Two hot mills went on last week and it is the intention of the company to put on six more mills this week. The Beech Bottom works, another Whitaker-Glessner unit, started up several weeks ago and is operating without trouble, despite the activities of the Amalgamated Association of Iron, Steel and Tin Workers of North America, which is actively contesting efforts of the company to operate its plants on the American plan of direct agreement with its workmen.

Miners Idle in Pennsylvania

HARRISBURG, PA., April 24—Figures just announced by the State Department of Labor and Industry estimate that there are 194,698 miners idle in the bituminous coal fields, while it is estimated 95,000 men are idle in the hard coal region. The reports were gathered from the employment agencies located at various centers in the state and show that a total of 298,689 workmen are idle. In the Pittsburgh district 80,398 miners are reported to be out and reports from Johnstown indicate that 60,000 workmen are idle in that section. The McKeesport office reports that in the Monongahela Valley districts as far as Brownsville, about 25,000 men are idle, and as far as Connellsville in the Yough Valley about 30,000 miners are out. In the New Kensington district about 16,000 are idle. Reports from the Johnstown field indicate that there are about 40,000 non-union miners at work, but no figures are available on non-union operations in the other districts. Altoona has more than 8,000 miners idle and the Erie office reports about 300 in the Mercer County region.

J. F. Emmons, metallurgist of the Cleveland Twist Drill Co., Cleveland, Ohio, was the speaker at the April meeting of the Cincinnati Chapter of the American Society for Steel Treating, held at the Ohio Mechanics Institute on April 20. An informal discussion of tool hardening problems, illustrated with lantern slides, was held. The nominating committee submitted the names of candidates for officers for the ensuing year, which will be voted on at the regular May meeting.

VIGOROUSLY CONTESTED

Ore Rate Hearing Attracts Many Iron and Steel Manufacturers

WASHINGTON, April 25.—Contentions for and against vacating the order of the Interstate Commerce Commission suspending reduced rates on ex-lake and local Eastern ore are being made before Examiner Bronson Jewell. The hearing is being largely attended and was begun yesterday. So large is the number of witnesses and the volume of the testimony that it is to be continued over to-morrow. Iron and steel producers from the Atlantic seaboard west to and including Ohio districts and as far South and including Virginia and West Virginia, together with ore interests having mines in the Lake Superior and Eastern regions, and with representatives of the carriers, are participating in the proceeding. Much of the evidence being given is a repetition of that which has been presented previously, but the vigor with which the case is being contested is unusually pronounced.

Coupled with the case also is the complaint of the Buffalo iron and steel producers who are urging lower fuel rates to Buffalo and who charge they are out of proportion with the local and ex-lake ore rates, whose proposed reductions the Buffalo interests are opposing until fuel rates are cut.

Appearing for independent iron and steel interests in the Pittsburgh and nearby districts, is F. A. Ogden, general freight agent, Jones & Laughlin Steel Co., who urged that the proposed reductions in ex-lake ore rates be allowed to go into effect. He maintained that the reduced rates would stimulate the iron and steel industry. Asked if he favored reduction in rates on coal, Mr. Ogden replied that coal and ore rates are not related, but that he is in favor of cutting rates not only on coal but on all raw materials. He told of what the iron and steel industry has done to liquidate production costs, and said that it is necessary to bring them down further by reducing ore rates.

L. W. Francis, president of Witherbee, Sherman & Co., with ore mines at Mineville, N. Y., in asking that proposed reductions in rates on local Eastern ore be allowed to become effective, said this is necessary if the operations he represents are to continue competition with other local ex-lake and import ores in serving furnaces in the East. The necessity of reducing Eastern ore rates in order to lower production costs was explained by J. E. Rotthaus, representing the Ringwood Co., the North Jersey Steel Co., the Empire Steel & Iron Co. and the Thomas Iron Co.

Conditions Improving in Wisconsin

MILWAUKEE, WIS., April 24.—"Metal trades industries in Milwaukee are beginning to feel the stimulus of better conditions," is a significant statement in the current review of local conditions issued by the largest bank in Milwaukee, the First Wisconsin National. "Iron and steel foundries accounted for most of the gain in operations the past month. Light machine and machine-tool shops are having a slower recovery. Few plants are able to operate above 50 per cent of capacity and there are still a good many that run between 20 and 30 per cent. The outlook for more business, however, is favorable and another month should see substantial progress. The net increase in number employed, April 1, over March 1, by Milwaukee firms employing over 500 was 1822, or 4.8 per cent. Iron and steel and machinery firms took on 667 more men, an increase of 6.6 per cent; the automotive industries increased their employees by 351, or 11.9 per cent. Metal products other than iron and steel, and miscellaneous industries showed increases of 3.8 and 6.2 per cent respectively."

Latest reports from large industries show material improvement in employment. The A. O. Smith Corporation added 200 men in the last ten days, increasing the force to 1600 and bringing production to 80 per cent of normal. The Illinois Steel Co. added 200 men, making its force 800. The Bucyrus Co., South Milwaukee, added 40 men to the foundry force and is employing 950. The Ladish Drop Forge Co., Cudahy, is employing 300, an increase of 100 to 125. The Allis-Chalmers Mfg. Co. is making increases steadily, although authentic figures are not given out. The Milwaukee four-cylinder passenger car works of the Nash Motors Co. is working overtime, the schedule being 13 hours three days a week, and 10 hours the remaining three days.

Sizer Forge Co. Buys Hammond Plant

SYRACUSE, N. Y., April 24.—Steps have been taken by the receiver of the Hammond Steel Co. to sell the Hammond plant to the Sizer Forge Co. at Buffalo. The expansion of the Sizer properties thus provided for will give the Buffalo organization greater capacity in smaller forging work than it now has, and in particular will give it an output of rolled products of electric steel. The Hammond works, which are at Solvay, N. Y., have a 16-in. and a 10-in. bar mill, in addition to steam hammers and hydraulic pressing equipment.

It is understood that the name of the Sizer Forge Co. will be changed to the Sizer Steel Corporation and that the headquarters will remain at Buffalo and under the existing management at Buffalo. The Buffalo works were rebuilt in 1919, and in a plant notable for its lofty modern buildings have two 10-ton Heroult electric furnaces and an unusual equipment for manufacturing heavy crank shafts for Diesel engines, for making tool steel billets and special heavy steel products for the oil well drilling trade and for the manufacture of die blocks of electric steel, standardized some time ago by the Sizer company. The acquisition of the Hammond plant will extend the scope of the Sizer participation in the steel business of the country.

Inspecting Gears and Gear Cutters

(*Continued from page* 1138)

hardened gears, with the black of the furnace on them, show some reflection under the glare of the arc. It is our conclusion that, in general, any ordinary gear will show reflection enough to allow measurement in reasonable proportion to the accuracy of the surface measured."

What promises, according to Mr. Flanders, to be the most practical application of this principle is embodied in the device shown in one of the illustrations. A battery of needles laid side by side in the shallow groove of a suitable holder are held in place by a sheet rubber pad between them and a rotatable spindle (shown in the illustration as a small twist drill). When a gear is mounted in the fixture as shown, and the spindle is revolved between the fingers, the needles approach the tooth outline, stopping in contact with it for its entire length from top to root. The views show the whole apparatus at work, with the inspector in the operating position, and the image on the screen.

Mill orders have been issued by the American Bridge Co., Ambridge, Pa., on 1565 tons of structural steel for the Oak Street viaduct, ordered by the city of Youngstown. The contract was awarded at the company's bid of $56 per ton for furnishing the steel and $13 for erecting it. In addition the contract called for erection of a cast iron water pipe line, and aggregated $108,985. The Penn Bridge Co. bid $69.80 for supplying the steel and $16.40 per ton for its erection. Eight bids were entered.

The Penn Seaboard Steel Corporation, Franklin Bank Building, Philadelphia, has acquired the plant of the Titusville Forge Co., Titusville, Pa., and that of the Rockaway Rolling Mills Corporation, Beach Street, Rockaway, N. J. Both plants will be continued in operation and arrangements perfected for immediate increase in production. A primary feature of manufacture at the Titusville plant will cover oil well machinery and parts.

Machinery Markets and News of the Works

SINGLE TOOL SALES THE RULE

Little Change in Volume of Orders—Slight Increase in Inquiry

Further Addition to Santa Fe List—New Pipe Plant Expected to Take Considerable Equipment

A fair volume of orders from scattered sources and mostly for single machines is reported from the majority of centers. In some sections the demand for used tools predominates. At Chicago, railroads are still conspicuous inquirers.

The Santa Fe has made further additions to its list, the added tools being a car-wheel lathe, a 6 ft. radial drill, a single-end angle iron shear, a single-end punch and shears, a 20-ft. plate bending roll, two single end punches, a double-end punch and shear, a splitting shear and an angle iron bending roll. The Santa Fe is also inquiring for a 15-ton crane. The Monon has entered the market for a 5 ft. radial drill and the St. Paul for a 44-in. vertical boring mill and a 36-in. lathe. The Pennsylvania Railroad is asking for two tool grinders.

A Massachusetts manufacturer has come into the market for three lathes, a plain milling machine, two grinders, a shaper, a turret tool and a vertical milling machine, for use in its apprentice school. The American Steel Foundries is inquiring for a 5-ft. radial drill and two engine lathes for its East St. Louis plant. The Boston Structural Steel Co., Cambridge, Mass., is looking for used machinery.

Decision by the Steel Corporation to go ahead on the construction of the new pipe plant at Gary, Ind., is reported from Pittsburgh as being very heartening to the machinery and equipment trade there. It is understood that the final plans call for about 84 cranes.

The Otis Elevator Co. has bought a number of machine tools recently for its Yonkers, N. Y., plant.

Price changes noted include a 10 per cent reduction by the Standard Machinery Co., Auburn, R. I., on its line of punch presses, drop hammers and swaging machines. N. A. Strand & Co., Chicago, has made public new prices on flexible shaft outfits, some of them having been reduced 10 per cent.

As to the outlook, it is reported from Chicago that sellers generally are in a more optimistic mood. Cleveland reports conditions in metal working industries as continuing to grow better and drop forging makers report increase in demand from various industries outside of the automotive field. In Milwaukee, machine shops are adding men steadily, but few as yet are operating more than 50 per cent of capacity.

Much interest is shown in the Boston district in the announcement by the Amoskeag Mfg. Co., Manchester, N. H., that the company is to discontinue construction of textile machinery and parts.

New York

NEW YORK, April 25.

The New York machine tool market has shown only a slight improvement the past week. Some sellers are receiving a few more inquiries, but the change for the better, if any, is almost negligible. The General Electric Co., Schenectady, N. Y., has bought a few tools, but other purchases during the week were mostly single machines, and the demand for used tools continues to predominate.

The crane market in this district was unusually dull the past week, few closings being reported and no new inquiries of importance having appeared. The Burnham Boiler Corporation, Irvington, N. J., which recently issued an inquiry for a 3-ton, 28-ft. span electric crane, is reported to have purchased six used Shepard cranes from an electric steel casting company in Pennsylvania. An inquiry has appeared from the Allen S. Davison Co., Oliver Building, Pittsburgh, for a 10-ton, 50-ft. span overhead traveling crane for the Sharpsville Furnace Co., and there is an inquiry current in the New York district for a 40-ton overhead traveling crane.

Among recent sales are: Industrial Works, a 160-ton wrecking crane to the Canadian Pacific Railway Co., Montreal; Philip T. King, 30 Church Street, New York, a 20-ton, 50-ft. boom used Ohio locomotive crane to Russell, Birdsall & Ward, Port Chester, N. Y.

J. B. Hauer, Inc., 96-100 Bayard Street, Brooklyn, manufacturer of metal boxes and containers, is having plans prepared for a new one-story factory, 50 x 200 ft., on Guernsey Street, to cost about $21,000. Henry C. Brucker, 2549 Myrtle Avenue, Brooklyn, is architect.

The National Foundry Co. of New York, 10 Sandford Street, Brooklyn, is planning for the installation of welding and other equipment at its plant.

The United Electric Light & Power Co., 130 East Fifteenth Street, New York, has completed plans and will soon commence the erection of a new five-story addition to its power house at 204-6 Elizabeth Street.

The Bureau of Yards and Docks, Navy Department, Washington, will call for bids in the near future for a reciprocating air compressor for the Brooklyn Navy Yard, under specification 4555.

William C. Bergen, 130 East 180th Street, New York, is having plans prepared for a two-story automobile garage and service building on Webster Avenue to cost $150,000, including equipment. A machine shop will be installed. Charles S. Clark, 441 Tremont Avenue, is architect.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, is taking bids on a general contract for a new power plant at the foot of Sixty-sixth Street, estimated to cost in excess of $1,000,000 with machinery. It is disposing of a stock issue for $10,000,000, to be used in part for the new plant and other power house expansion. G. L. Knight, company address, is engineer.

The Intertype Corporation, 50 Court Street, Brooklyn, manufacturer of line casting machines for printing, and parts, is disposing of a bond issue of $750,000, a portion of the proceeds to be used for extensions and improvements.

A vocational department will be installed in the new three-story high school, 248 x 290 ft., to be erected at Rockville Centre, L. I., estimated to cost $500,000. Huse T. Blanchard, 137 East Forty-sixth Street, New York, is architect.

The Watertown Garage Corporation, Watertown, N. Y., is having plans prepared for a one-story garage and service building, to include machine shop, estimated to cost about $80,000. A. F. Lansing, Sherman Building, is architect.

Motors, controlling devices, electrical and mechanical power equipment and other machinery will be installed in the seven-story printing plant to be erected by the New York *Tribune*, Inc., 154 Nassau Street, New York, at 219-29 West Fortieth Street, estimated to cost about $500,000. Lockwood, Greene & Co., 101 Park Avenue, are architects and engineers.

The Manila Electric Co., Manila, P. I., operated by the J. G. White Management Corporation, 43 Exchange Place, New York, is disposing of a bond issue of $2,500,000, to be used in part for additions in electric power plants and system and other operations. Charles M. Swift is president.

The Alexander Pelli & Co. Marble Works, 509 East 120th Street, New York, is completing plans for a new one-story plant, 105 x 157 ft., at Queens Boulevard and Albine Street, Elmhurst, L. I., to be equipped for grinding, polishing and other operations, with machinery for hoisting, conveying, etc. It will cost about $75,000. L. P. Fluhrer, 280 Madison Avenue, New York, is architect.

The Paulista Railway Co., Sao Paulo, Brazil, represented by Ladenburg, Thalmann & Co., 25 Broad Street, New York, is disposing of a bond issue of $4,000,000, of which about $2,500,000 will be used for the electrification of the company lines in a part of the State of Sao Paulo, including generating plants, system, etc., and for other additions and improvements.

William R. Noe & Sons, 43 East Tenth Street, New York, manufacturers of electric fixtures, etc., have filed plans for a new three-story concrete factory, 100 x 100 ft., at Willoughby Avenue and Raymond Street, Brooklyn.

The H. Derouin Co., 137 Charles Street, Watertown, N. Y., manufacturer of sheet metal equipment, is planning for the installation of new machinery.

A vocational department will be installed in the new high school to be erected at Saratoga Springs, N. Y., estimated to cost about $400,000.

The Department of Public Works, Capitol Building, Albany, N. Y., is having plans prepared for new mechanical shops for State service, estimated to cost about $150,000 with equipment. Charles L. Cadle is superintendent; Frank M. Williams, Telephone Building, is engineer.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until May 16 for a quantity of leather belting for use at the Brooklyn and other navy yards, totaling 2200 ft.

The Clydesdale Motor Truck Co., 437 Fifth Avenue, New York, is arranging to extend the general line of manufacture at its Clyde, Ohio, plant, for the production of a new all-steel motor truck.

Fire, April 16, destroyed the forge and carpenter shop at the plant of the Tottenville Copper Works, Tottenville, S. I., including tools and equipment. The estimated loss has not been announced.

The Charles R. Bates Co., Inc., 21 Howard Street, New York, manufacturer of railroad equipment, will install new tools and other metal-working equipment at its plant.

A vocational department will be installed in the new two-story and basement high school to be erected at Fulton, N. Y. It will cost $415,000. Wilson Potter, 22 East Seventeenth Street, New York, is architect.

The Durant Motors, Inc., 1819 Broadway, New York, is negotiating for the purchase of property in the vicinity of its plant at Long Island City, to be used for the erection of an addition. William C. Durant is president.

A new company is being organized by Hyman Shorenstein, 449 Saratoga Avenue, Brooklyn, and James A. McQuade, City Register, to construct and operate an ice-manufacturing and refrigerating plant at Riverdale and Van Sinderen avenues, Brownsville, Brooklyn. It will be two stories, 100 x 100 ft., and estimated to cost close to $1,000,000, including machinery. It plans for an ultimate capitalization of $5,000,000.

The Garford Motor Truck Co., 427 West Forty-second Street, New York, has leased a portion of the building on the Bridge Plaza, near William Street, Long Island City, from the Standard Steel Car Co. for local works.

A one-story power house will be erected by the Cupra Silk Co., Hawthorne, N. J., in connection with the erection of a new mill at Clifton, N. J. The Technical Advisory Corporation, 132 Nassau Street, New York, is engineer.

A vocational department will be installed in the new central high school to be erected at South Orange, N. J., site for which is being acquired at Parker Avenue and Academy Street. It is estimated to cost in excess of $200,000.

Motors, conveying and grinding machinery and other equipment will be installed in the new fertilizer manufacturing plant to be erected by the South Jersey Farmers' Exchange, Woodstown, N. J., to replace a factory recently destroyed by fire with loss of about $150,000.

The Pennsylvania Railroad Co., Pennsylvania Terminal, New York, has plans under way for rebuilding the portion of its car and locomotive shops at Kearny, N. J., destroyed by fire April 16 with loss estimated at about $500,000.

A power house will be built by the Board of Commissioners in connection with the new Irvington Hospital, Irvington, N. J., bids for which are being received until May 3. Runyon & Carey, 843 Broad Street, Newark, N. J., are engineers.

The Standard Electric Co., 126 South Street, Newark, N. J., manufacturer of electrical products, has leased the upper portion of the building at Mulberry and Oliver streets for a new plant. Equipment will be installed at once and the present works removed to this location. It is planned to give employment to about 200 operatives.

The P. W. P. Mfg. Co., Newark, manufacturer of wireless equipment, has been taken over by the International Radio Corporation, recently organized under Delaware laws. The building at 42-46 Branford Place has been acquired by the purchasing company and the present plant removed to this location. Increase will be made in capacity at the new location. Elmer T. Weight is president, and Gerald W. Knight, treasurer and engineer.

Chicago

CHICAGO, April 24.

The little change that has taken place in the local machine tool market has been one of sentiment rather than of volume of business. Sales are still relatively insignificant and greatly outnumbered by inquiries. Sellers generally, however, are in a more optimistic mood, not because they believe a marked change in business is in immediate prospect, but rather because they feel that substantial progress is being made in the direction of industrial revival and that it is only a question of time when increased shop activity will be reflected in purchases of equipment. Most recent sales have covered single machines. A Wisconsin user, however, has closed for six punch presses, an engine lathe, a shaper, an emery wheel grinder and a small shear. The railroads are still conspicuous as inquirers. The Santa Fé has made further additions to its list, while the Monon has entered the market for a 5-ft. radial drill and the St. Paul for a 44-in. vertical boring mill and a 36-in. lathe. The American Steel Foundries is inquiring for a 5-ft. radial drill, a 20-in. engine lathe and a 24-in. engine lathe for its East St. Louis plant. The Pollak Steel Co. is in the market for a second-hand power-driven hack saw for its South Chicago plant. The additions to the Santa Fé list are as follows:

One car wheel lathe.
One 6-ft. radial drill.
One single end angle iron shear with capacity to shear angles 4 x 4 x ½ in.
One single end punch and shear with 16-in. throat with capacity to punch 1¼-in. hole in 1¼-in. plate.
One 20-ft. plate bending roll with capacity for bending 1-in. plate.
One single end punch with 18-in. throat with capacity to punch 1-in. hole in ½-in. plate.
One double-end punch and shear with 48-in. throat, capacity 1¼-in. hole in 1¼-in. plate.
One single end punch with 12-in. throat, capacity 9/16-in. hole in 5/16-in. plate.
One splitting shear, capacity up to 1¼-in. plate
One angle iron bending roll, capacity angles 4 x 4 x ½ in.

The Standard Machinery Co., Auburn, R. I., has announced a 10 per cent reduction on its line of punch presses, drop hammers and swaging machines. N. A. Strand & Co., Chicago, have made new prices on flexible shaft outfits, some having been reduced 10 per cent.

The Ford Motor Co. has bought 72 tumbling barrels for its River Rouge plant from the Whiting Corporation and 12 helical geared 1500-lb. Whiting ladles. The city of Anderson, Ind., has ordered a 15-ton Whiting hand power crane for its power plant, and the Hubbard Steel Foundry, East Chicago, Ind., has bought one 30-ton Whiting ladle.

The Atwell Printing & Binding Co., 732 Sherman Court, Chicago, has let contracts for an eight-story printing plant, 120 x 177 ft., at the southwest corner of Prairie Avenue and Twentieth Street, to cost $600,000.

Alfred S. Alschuler, architect, 28 East Jackson Boulevard, Chicago, has taken bids on a six-story printing plant, 125 x 125 ft., at the southeast corner of Laflin Street and Jackson Boulevard, for the U. S. Sample Co., printer, now at 801 South Wells Street. The estimated cost is $350,000.

The Swigert Paper Co., 653 South Wells Street, Chicago, has let contract for a 10-story factory, 93 x 102 ft., at 717-23 South Wells Street, to cost $200,000.

The R. & C. Lap Co., Davenport, Iowa, has been incorporated with $100,000 capital stock to manufacture lap and expansion reamers and miscellaneous appliances and tools. It will also conduct a general foundry and machine shop business. The officers include: President, L. S. Rasmusen; vice-president and treasurer, H. B. Carlson; secretary, A. M. York.

The Lake City Utility Co., a recently organized corporation, Lake City, Iowa, has been granted a franchise to construct and operate an electric light, heat and power plant in that city.

The Belle Clair Foundry Co., Belleville, Ill., has been sold on foreclosure proceedings to Richard W. Hilgard.

Richard J. Dunne and B. Emmet Hartnett have taken over the jobbing foundry of the Channon-Dangel Co., 306 West Ontario Street, Chicago, and will manufacture aluminum, brass and bronze castings under the style of the Dunne-Hartnett Foundry. Mr. Dunne was formerly associated with the Hill Pump Valve Co., while Mr. Hartnett was identified with the Arrow Engineering Co.

The Chicago & Northwestern Railroad has taken bids on the construction of a 450-ton mechanical coaling station and ash handling plant at Chicago Avenue, Chicago, to cost $100,000.

The Paasche Air Brush Co., 1219 West Washington Boulevard, Chicago, has let contract for a two-story factory, 150 x 150 ft., at 1909-15 Diversey Parkway, to cost $75,000.

The Reo Joliet Sales & Service Co., 121 South Bluff Street,

Joliet, Ill., has taken bids on a one-story garage, 50 x 124 ft., to cost $42,000.

The Aero Toy Co., 601 Marquette Building, Chicago, was recently incorporated to give employment to crippled soldiers and will manufacture toys of metal, wood and composition. About 2000 sq. ft. of floor space has been secured at 519 South Clark Street and the equipment will consist of small woodworking machines, two or three punch presses and sheet metal shears. The officers are R. E. Miller, president; W. H. Locher, vice-president, and Emil Noltin, secretary.

The L. W. Smith Co., jewelry manufacturer, 320 North May Street, Chicago, is building a one-story factory, 100 x 150 ft.

G. F. Williams, 2416 East Twelfth Street, Kansas City, Mo., plans to construct a one-story machine shop, 50 x 132 ft.

The Central Illinois Public Service Co., Harrisburg, Ill., has acquired about 200 acres near Grand Tower, Jackson County, as a site for an electric generating plant. It will have an ultimate capacity of about 200,000 hp.

The Western Radiator Corporation, Casey, Ill., has awarded contract to the Austin Co., 208 South LaSalle Street, Chicago, for a new one and two-story plant at Casey, 150 x 275 ft., estimated to cost about $100,000, including machinery.

E. R. Watts, Dixon, Ill., will build a new one-story automobile service works, 50 x 150 ft., including machine shop, to cost about $45,000. Plans have been prepared.

The Ottumwa Railway & Light Co., Ottumwa, Iowa, has plans under way for an addition to its electric power plant. New equipment will be installed.

The Illinois Central Railroad Co., 135 East Eleventh Place, Chicago, will commence work in July for the electrification of its local terminal and lines, to include power houses, substations, etc., estimated to cost close to $10,000,000, including equipment. To provide funds the board of directors has approved a preferred stock issue of $50,000,000. C. H. Markham is president.

A one-story power house will be erected by the Benedictina Convent, Lisle, Ill., 45 x 100 ft. Shattuck & Layer, 19 South La Salle Street, Chicago, architects, are in charge.

The Englewood Optical Co., 5958 Eggleston Avenue, Englewood, Ill., is planning for the installation of new precision machinery, including lathe for cutting small screws, lathe for experimental tool work, milling machine, etc. E. E. Hilborn is general manager.

A vocational department will be installed in the two-story high school to be erected at Carbondale, Ill., estimated to cost about $100,000. Plans have been prepared by Beuttler & Arnold, Grain Exchange Building, Sioux City, Iowa, and are being temporarily held in abeyance.

A vocational department will be installed in the two-story and basement high school to be erected at Canton, S. D., estimated to cost about $200,000. Plans have been completed. Schuemacher & Finkelner, Sioux Falls, S. D., are architects.

Philadelphia

PHILADELPHIA, April 24.

Freight handling equipment, conveying machinery, elevators, etc., will be installed in the eight-story, reinforced-concrete warehouse to be erected by the Baltimore & Ohio Railroad Co., Philadelphia, at Twenty-third and Walnut streets, 102 x 102 ft., for which bids will be received until May 1. LeRoy B. Rothschild, 1225 Sansom Street, is architect.

The H. T. Paiste Co., 3201 Arch Street, Philadelphia, manufacturer of electrical equipment, has filed plans for a new four-story factory, 104 x 108 ft., at Cherry and Thirty-second streets, to cost about $100,000.

John Dunn and Charles Andress, Philadelphia, have leased the building at 318-20 North Thirteenth Street, for the establishment of a new machine and repair works.

J. A. Cunningham, Philadelphia, care of R. W. Pollock, 1802 Chestnut Street, architect, will build a two-story automobile service building at 1155-57 South Broad Street, to include a machine shop, to cost about $80,000.

The Nustone Products Co., 3450 Richmond Street, Philadelphia, manufacturer of sanitary products, plumbing specialties, etc., has taken bids for a new plant at Schiller and Allen streets. Ritter & Shay, North American Building, are architects.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until May 2, for 50 electric drills and 15 attachments for the Philadelphia Navy Yard; also for motors, control panels and spare parts.

C. V. Hill & Co., Pennington Avenue, Trenton, N. J., manufacturers of refrigerators, refrigerating equipment, etc., have filed plans for a two-story addition, 50 x 190 ft., to cost about $25,000.

A vocational department will be installed in the new high school to be erected at Phillipsburg, Pa., estimated to cost about $300,000.

Athenas George, 1601 Eleventh Avenue, Altoona, Pa., is organizing a company to construct and operate a new electric generating plant on Independence Island in the Susquehanna River, near Harrisburg, Pa. Walter Frieling, 1312 Fourteenth Avenue, Altoona, is architect and engineer.

The Self-Change Making Drawer Co., Inc., Allentown, Pa., recently organized with a capital of $100,000 to manufacture automatic change-making drawers for cash registers, is arranging for the establishment of a local plant. P. D. Wotring, Allentown, is treasurer.

The Pennsylvania Edison Co., Easton, Pa., has acquired property at Holland, N. J., and has tentative plans under consideration for a new power house, with distributing system in this district.

Vocational departments will be installed in the new high schools to be erected by the Radnor Township School Board, Ardmore, Pa., and at Bryn Mawr, Pa., estimated to cost $400,000 and $300,000, respectively. Savery & Scheetz, St. Girard Building, Philadelphia, are architects for the first noted, and Ralph E. White, Pennsylvania Building, Philadelphia, for the Bryn Mawr structure.

The Sunbury Water Co., Sunbury, Pa., will commence the immediate erection of a new power house, 50 x 50 ft., at its waterworks. A one-story addition will also be built to the pumping plant. William H. Dechant, 632 Washington Street, Reading, Pa., is engineer.

The Pennsylvania Railroad Co., Philadelphia, has tentative plans under consideration for new steel car works at Marysville, Pa. The proposed shops will supersede the similar plant recently announced to be located at Enola, Pa., it is said, and the latter project abandoned. The estimated cost is reported at $500,000.

A vocational department will be installed in the new Glen-Nor high school to be erected by the Joint School Boards of Glenolden and Norwood, Pa., on South Avenue, Ridley Township, between the two places noted, bids for which are being received until May 16. Clarence W. Brazer, Crozer Building, Chester, Pa., is architect.

The plant of the Bethlehem Motors Corporation, Allentown, Pa., operating under a receivership, has been purchased by Howard B. Hall, former vice-president of the company, at a public sale for $550,000. Plans are under way for a reorganization of the company with Mr. Hall as president and general manager, and the rehabilitating of the plant to manufacture motor trucks. The Pottstown works of the company will also be acquired and operated. Arthur T. Murray, former president of the company, and now head of the American Bosch Magneto Co., Springfield, Mass., is interested in the reorganization.

The Borough Council, Chambersburg, Pa., will soon take bids for the erection of a new one-story municipal electric power plant on Third Street, 80 x 95 ft., to cost about $150,000, including equipment. Albert C. Wood, Stock Exchange Building, Philadelphia, is engineer.

A vocational department will be installed in the new junior high school to be erected at Scranton, Pa., bids for which will be received until May 22.

Pittsburgh

PITTSBURGH, April 24.

Announcement by Judge Gary that the Steel Corporation has finally decided to go ahead on the construction of the new pipe plant at Gary, Ind., is very heartening to the machinery and equipment trade here. This plant originally was projected about five years ago and the plans are completed, leaving only the detail of asking for the latest prices before some business will come out. It is understood that final plans call for about 84 cranes. The situation, locally, has been quiet the past week, although there has been a fair amount of machine tool business out of dealers' stocks and inquiries are reported in fair volume for both machine tools and cranes. The Lorain Steel Co., Johnstown, Pa., a subsidiary of the United States Steel Corporation, is expected to close for two 10-ton and two 15-ton cranes this week. The Northern Engineering Works recently sold to the H. Koppers Co. a 3-ton hoist and to the International Nickel Co. two 2-ton, 2-motor hoists. It also has taken an order for two 2-ton, 3-motor cranes for the Ajax Iron Co. The Cleveland Crane & Engineering Co., through its tram rail division, has received orders from the Standard Sanitary Mfg. Co., Pittsburgh, for one 120-ft. 1000-lb. electric tram rail, one 360-ft. 2-ton hand-powered tram rail and one 180-ft. 1-ton electric tram rail.

G. S. White, 349 Atwood Street, Pittsburgh, is making inquiries for a caterpillar type crane, with clam shell bucket of about ¾-yd. capacity.

The Apperson Automobile Co., Pittsburgh, has leased

space in the building at 5932 Baum Boulevard, for a factory branch.

The Raylo Co., Indiana, Pa., recently organized to manufacture electric lighting equipment and kindred products, is taking bids for a four-story plant, 50 x 80 ft., to cost about $90,000. F. A. Hersh & F. J. Shaller, Commerce Building, Altoona, Pa., are architects.

A vocational department will be installed in the two-story high school to be erected at Monaca, Pa., 125 x 135 ft., estimated to cost about $150,000.

The Virginia-Western Power Co., Clifton Forge, Va., will commence the immediate erection of an addition to its power plant at Ronceverte, W. Va., to cost about $500,000, including machinery and line extensions.

Fire, April 16, destroyed the machine shop of the Long Orchard Co., Keyser, W. Va., with loss about $30,000, including equipment.

Pumping machinery, power equipment and other mechanical apparatus will be installed in connection with the new filtration plant at the waterworks, Wheeling, W. Va., estimated to cost $1,500,000. Morris Knowles, Pittsburgh, is engineer.

The Enterprise Foundry Co., 1400 Nixon Street, Pittsburgh, is arranging for the installation of new equipment to replace that recently destroyed by fire.

A vocational department will be installed in the new central high school to be erected by the Red Stone Township Board of Education, Republic, Pa., to cost about $200,000. J. H. Harmon, 632 Fayette Title & Trust Building, Uniontown, Pa., is architect.

New England

BOSTON, April 24.

More life in the New England machine tool market is noted, but no real activity. Competition for business among new and used machinery dealers continues to work to the advantage of the buyer. Because of this, buyers are slow to close, and the accumulation of pending business grows. The improvement in the machine shop situation in some parts of Maine, western Massachusetts and Connecticut is more pronounced than in and about Boston because of the inactivity heretofore in these places. Greater Boston machine shops continue more active than elsewhere. A Quincy, Mass., manufacturer of package and weighing machinery has just received from a California fruit interest a large order for package machinery, involving seven figures.

New inquiries the past week include one from a Massachusetts manufacturer for nine tools to be used in connection with the corporations apprentice school. The list calls for one 10-in., one 14-in. and one 16-in. lathe, one plain milling machine, two grinders, one 16-in. shaper, one turret tool, and one vertical milling machine. The Boston Structural Steel Co., Cambridge, is in the market for a No. 2 Brown & Sharpe automatic screw machine, or equal; a No. 20 Bliss punch press, or equal; one small hand screw machine, and one rotary shear, all used equipment.

A Brockton, Mass., continuation school has purchased two 13-in. x 5-ft. and one tool room South Bend lathes and a 16-in. shaper; a Massachusetts manufacturer of oil burning apparatus has closed on six used tools, including lathes, shapers and milling machines; the Beacon Automatic Machine Co., Roxbury, Boston, bought a used 14-in. Pratt & Whitney engine lathe, and the Trinity Radio Co., Dartmouth Street, Boston, small machine shop equipment. The Standard Tire & Rubber Co., Portland Street, Boston, has purchased a tool and a machine manufacturer on Atlantic Avenue, Boston, and is adding Greenfield grinding and Pratt & Whitney tool room equipment. Joseph Beal & Co., Boston, have purchased punching and shearing machinery, plate-bending rolls, pipe and bolt threading machines, steam and belt driven hammers, lathes, planers, etc., from the Texas Steamship Co., Bath, Me.

Much interest was shown in the local machine tool trade in the announcement by the Amoskeag Mfg. Co., Manchester, N. H., cotton goods manufacturer, that the 700 machinists and workers in allied trades on strike, will not be needed when the mills resume operations. The company is to discontinue the construction of textile machinery and parts as the work can be done more economically in outside establishments.

The Universal Radio Corporation, 220 Devonshire Street, Boston, has leased space at 1 Market Square, Lynn, Mass., which it is equipping for the production of radio sets and supplies. It will employ approximately 100.

The Fress Carriage Co., Concord Street, Lawrence, Mass., is taking bids on an addition, two stories, 44 x 93 ft.

The E. R. Hitchcock Co., New Britain, Conn., will build a three-story plant, 42 x 95 ft., on Chestnut Street, to be used as a printing establishment.

The Connecticut Light & Power Co., 111 West Main Street, Waterbury, Conn., will build a three-story, 61 x 133 ft. power house addition, on Freight Street.

Plans are being prepared for a one-story addition, 65 x 120 ft., to the trade school on Bridgham Street, Providence, R. I. William E. Hartwell is commissioner of buildings.

Generator and other electrical equipment is being installed at the plant of the Empire Knife Co., Winsted, Conn. Much of the machinery hereafter will be electrically operated.

The Arcade Malleable Iron Co., Worcester, Mass., plans the installation of new furnace equipment and additional facilities for the trimming and shipping departments. H. P. Blumenauer is vice-president and general manager.

The Westinghouse Electric & Mfg. Co., Springfield, Mass., has filed plans for a new unit to cost approximately $80,000, to be used for producing radio apparatus, and to give employment to 500 additional men.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until May 2 for one air compressor set complete, with motor, controller and spare parts, for the Portsmouth, N. H., navy yards.

A vocational department will be installed in the two-story high school, 53 x 150 ft., to be erected at Presque Isle, Me., estimated to cost about $150,000. It will replace a structure recently destroyed by fire. Victor Hodgins, 39 Hammond Street, Bangor, Me., is architect.

The Union Specialty Co., 138 Hurd Avenue, Bridgeport, Conn., manufacturer of metal products, will increase the size of its addition, now in course of erection, from two to three stories, 50 x 120 ft., to cost in excess of $75,000.

A vocational department will be installed in the new high school to be erected at South Portland, Me., estimated to cost $180,000. Miller & Mayo, Portland, Me., are architects.

The Connecticut Marine Boiler Works Co., Kossuth Street, Bridgeport, Conn., will increase the line of production at its plant to include galvanized iron and tin specialties. Manufacture will also be concentrated on a new combination metal door and lock.

The Hygrade Lamp Co., Salem, Mass., manufacturer of electric lamps, is completing plans for a four-story addition, 50 x 110 ft.

A vocational department will be installed in the three-story high school to be erected at Wakefield, Mass., 85 x 208 ft. Frank I. Cooper, 172 Tremont Street, Boston, is architect.

The Connecticut Light & Power Co., Waterbury, Conn., has filed plans for a four-story and basement service building, 60 x 133 ft., with garage and repair department for company trucks and cars, to cost about $80,000. Louis A. Walsh, 51 Leavenworth Street, is architect.

The Palmer Steel Co., Holyoke, Mass., recently organized with a capital of $100,000, will soon commence the erection of a one-story plant, 80 x 200 ft., at Williamsett, for the fabrication of structural steel products. Earl Palmer is president, and Wayne F. Palmer, 7 Montgomery Avenue, treasurer.

The plant of the J. B. Tatem & Son Co., manufacturer of handles, etc., Putnam, Conn., was destroyed by fire April 18, causing damage estimated at $25,000.

The Pitman Mfg. Co., Laconia, N. H., is having plans prepared by Lockwood, Greene and Co., engineers, Boston, for a three story addition, 65 x 100 ft.

Baltimore

BALTIMORE, April 24.

The National Radiator Co., 15 East Fayette Street, Baltimore, with headquarters at Johnstown, Pa., has awarded contract to the Charles L. Stockhausen Co., Gay Street, for a new one-story plant to cost about $35,000.

A power house will be erected at the new municipal hospital at Montebello Park, Baltimore, to cost $750,000. The City Hospital Commission is in charge. Edward H. Glidden, American Building, is architect.

The Potomac Public Service Co., Hagerstown, Md., comprising the former Hagerstown & Frederick Railway Co., has sold a bond issue of $2,155,000, a portion of the proceeds to be used for power plant and line extensions and betterments. Emory L. Coblentz is president.

The White Foundry Co., Roanoke, Va., recently organized, has plans under way for a one-story foundry, with initial production of about five tons of grey iron castings. Howard H. White, 613 Tenth Avenue, S. E., is president and general manager.

A vocation department will be installed in the three-story high school to be erected at Suffolk, Va., estimated to cost about $150,000. C. M. Robinson, Times-Dispatch Building, Richmond, Va., is architect.

Fire, April 15, destroyed the veneering plant of the

Utility Mfg. Co., Goldsboro, N. C., with loss estimated in excess of $200,000, including equipment.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until May 9, for 12 engine lathes and 12 combination drill cutters and grinders, for Eastern and Western navy yards; also for 16,500 steel bolts and nuts for the Mare Island Navy Yard.

The Pennsylvania Railroad Co., and the Norfolk & Western Railroad Co., Baltimore, have tentative plans under consideration for the erection of a joint locomotive and car repair plant at the junction of the two lines at Hagerstown, Md.

The Petersburg Farm Machine Corporation, 1009 South Sycamore Street, Petersburg, Va., recently organized, is having plans prepared for a new one-story factory to manufacture agricultural implements and farm machinery. Horace L. Smith, Sr., heads the company.

A one-story power house will be erected by the American Furniture Co., Martinsville, Va., at its plant. Lockwood, Greene & Co., Charlotte, N. C., are engineers.

The Georgia Railway & Power Co., Atlanta, Ga., has disposed of a bond issue of $3,500,000, a portion of the proceeds to be used for extensions and improvements in electric power plants and system. Work will soon commence on a new one-story power house at Dalton, Ga. H. M. Atkinson is chairman of the board.

The City Council, Tifton, Ga., is contemplating the erection of a municipal electric power plant to cost about $45,000.

The Interstate Packing & Ice Co., Norfolk, Va., recently organized with a capital of $150,000, is arranging for the establishment of an ice-manufacturing plant with initial capacity of about 50 tons per day. J. T. Lynch is president and Charles R. Barnes, secretary.

The Bureau of Yards and Docks, Navy Department, Washington, has specifications in preparation for alternators and auxiliary electric equipment for the navy yards at Yorktown, Va., and for a reciprocating air compressor at Bellevue, D. C. The specifications will be numbered 4612 and 4622 respectively.

The Patrick Henry Cold Storage Co., Koehler, Va., will commence the immediate erection of a new five-story ice and cold storage plant, 100 x 120 ft. J. R. Walker is secretary and treasurer.

Fire recently destroyed the service building and machine shop of the Motor Service Co., Lexington, N. C., with loss estimated at about $35,000. It is planned to rebuild at an early date.

The Tallassee Power Co., Badin, N. C., is arranging for extensions and improvements in its power plants and transmission lines to cost close to $4,000,000. It will operate in conjunction with the Carolina Power Co., a subsidiary of the Carolina Power & Light Co., Raleigh, N. C., which plans for the construction of a power house at Badin, with steel tower transmission system throughout this district. The last noted company will expend about $3,000,000 for the work.

The Continental Garage & Service Co., 715 Gaither Building, Baltimore, has filed plans for the erection of a five-story, 50 x 194 ft., automobile service, repair and parts manufacturing building at 637 North Eutaw Street, estimated to cost about $200,000, including equipment. Lawson L. Wagner, Baltimore, is architect. John C. Tolson heads the company.

Buffalo

BUFFALO, April 24.

The Buffalo Fire Extinguisher Co., Carroll Street, Buffalo, manufacturer of fire-fighting equipment, is completing plans for a two-story factory, 56 x 220 ft., on Central Avenue.

Bids for refrigerating and ice-making machinery, water filtration and water softening equipment will be received by the Department of Hospitals and Dispensaries, Buffalo, on May 8, in connection with miscellaneous equipment for the city hospital. George S. Staniland, M.D., is secretary.

A vocational department will be installed in the new high school to be erected at Williamsville, N. Y., estimated to cost about $175,000.

The National Lamp Works of the General Electric Co., Nela Park, Cleveland, will build a one-story power plant at its works at 757 East Ferry Street, Buffalo, and construct an addition to its water gas plant, to cost about $100,000.

The Highway Products & Mfg. Co., 735 Baldwin Street, Elmira, N. Y., will install sheet metal working equipment for the manufacture of iron culverts.

The Everyday Piston Ring Co., Rochester, N. Y., has acquired the buildings at Commercial and Roosevelt streets for its new plant. George E. Burgess is president.

W. J. Lohr, 311 Ridge Avenue, Lackawanna, Buffalo, is planning for the construction of a new ice-manufacturing plant on Lehigh Avenue, to cost about $65,000.

The Union Iron Works, Fifteenth and Cascade streets, Erie, Pa., manufacturer of boilers, tanks, etc., is having plans prepared for a new building to replace the portion of its plant destroyed by fire March 23, to cost about $100,000, exclusive of equipment.

R. Perry, Waverly, N. Y., is planning for the erection of a new one-story machine works on Elizabeth Street, to be used primarily for repair work, estimated to cost about $20,000.

The Binghamton Limestone Co., Binghamton, N. Y., is planning for the installation of crushing, grinding, conveying and other equipment.

The Board of Education, Lancaster, N. Y., has arranged a list of equipment to be installed for vocational work at the high school.

The Binghamton Light, Heat & Power Co., Binghamton, N. Y., will remodel its old power plant on Court Street for an automobile service and repair works for company trucks and cars.

J. Frank Norris, Nursery and Norris streets, Rochester, N. Y., will build a one-story addition to his artificial stone manufacturing plant, 45 x 150 ft. James R. Tyler, Union Trust Building, is architect.

The Gouverneur Limestone Co., Gouverneur, N. Y., is planning for the installation of new crushing and grinding machinery.

M. and H. Horowitz, Binghamton, N. Y., are planning the erection of a one-story machine shop, 50 x 75 ft., on property recently acquired at Hawley and Collier streets.

The Retsof Mining Co., Retsof, N. Y., is having plans prepared for a new one and two-story salt mining and refining plant, to cost in excess of $300,000, including machinery.

The Dexter Sulphite Pulp & Paper Co., Dexter, N. Y., is considering the installation of new machinery in the cutting and other departments of its plant.

The third annual machinery demonstration by Ogden R. Adams, Central Avenue and St. Paul Street, Rochester, N. Y., will be held June 2 and 3. This year two days will be given to the demonstration, which promises to be on a larger and more diversified scale than heretofore. Manufacturers and their technical experts from various parts of the country will be present to demonstrate their products.

Ohio

Cleveland machine tool manufacturers and dealers continue to get a fair volume of orders from scattered sources, but mostly for single machines. Single purpose production tools are in better demand than the more standard types. Sales on the whole show a gain over March. No new lists came out during the week, but considerable round lot business, largely for school requirements, is still pending. The only new railroad inquiry was from the Pennsylvania for a wet tool grinder and a drill grinder. Crane inquiries show an increase. Among these is one from the Santa Fe Railroad for a 15-ton crane. Makers of electrical control equipment report a better volume of orders and inquiries.

Conditions in metal-working industries in this territory continue to grow better and more men are being given employment. Makers of drop forgings report an increase in the demand for their product from various industries outside of the automobile field.

In Cincinnati there have been few developments in the machine tool industry, conditions being practically the same as during the previous week. Orders are still light and mostly for used tools. No new lists have appeared. Manufacturers have quoted on the Santa Fe inquiries which are expected to close within the next week or two. There is still a fair demand for small lathes for garage and light manufacturing purposes.

Construction has been stopped for the present on the proposed works of the Atlas Portland Cement Co. at Tippecanoe City, Ohio. Plans call for the construction of a $1,000,000 plant, the company having recently purchased 1000 acres in that vicinity.

The Loomis & Sieloff Co., Morgan Avenue, Cleveland, has purchased the drilling machinery business of the Demco Machine Tool Co., Cleveland, and will hereafter manufacture and market these machines. It will also make Siegrist universal water faucets, one of the products of the Demco company, which retains ownership in the faucet business. The Loomis & Sieloff Co., is closely affiliated with the Interstate Foundry Co. and the Grabler Mfg. Co., Cleveland.

The Dill Mfg. Co., 648 East Eighty-second Street, Cleve-

land, manufacturer of hardware for rubber companies and automobile accessories, is enlarging its plant by the addition of a third story.

The Torbensen Axle Co., Cleveland, has been reorganized by local interests, headed by J. O. Eaton, former president and general manager of the company. Mr. Eaton and his associates constitute practically the same group of men who for a long time had control. They have again acquired control through the purchase of the interest held by the Republic Motor Truck Co. The Torbensen company was organized in Newark, N. J., in 1911 and moved to Cleveland in 1915.

The Specialty Mfg. Co., 11414 Madison Avenue, Cleveland, plans the erection of a two story factory for the manufacture of wire brushes.

Owing to the increased demand of the Osgood Co. and other customers for steel castings, the Commercial Steel Castings Co., Marion, Ohio, manufacturer of open-hearth steel castings, is enjoying a larger volume of business than ever before experienced and has let contracts for the erection of buildings and additions to its present plant to double the output. Work will be started immediately and rushed to completion.

Detroit

DETROIT, April 24.

The Michigan Tool Co., 147 Joseph Campau Avenue, Detroit, has preliminary plans under way for the erection of a new one-story factory, 90 x 210 ft., to cost about $63,000. Richard Paterson is president.

The Riverside Coal Mining Co., Saginaw, Mich., is planning to rebuild the power house at its properties destroyed by fire April 18, with loss estimated at about $35,000.

The Aetna Portland Cement Co., 412 Union Trust Building, Detroit, will break ground early in May for its new plant at Essexville, Mich., to include machine shop, power house and other structures, estimated to cost about $1,000,000 with machinery. Oscar J. Lingeman is general manager.

Fire, April 14, destroyed a portion of the plant of the Monroe Body Co., Ludington, Mich., with loss estimated at $100,000, including machinery.

The Saxon Motor Car Co., Detroit, has leased the plant of the Apex Motor Co., Ypsilanti, Mich., for three years, with option to purchase. Initial production will total about 15 cars per day and employment will be given to about 200. It is said that the company proposes to remove its Detroit works to this location.

The Auto Collapsible Rim Co., Detroit, care of Peter R. Rossello, 406 Congress Building, architect, is having plans prepared for new eight-story works, 110 x 160 ft., on Bellevue Avenue, for the manufacture of metal rims for automobile wheels, estimated to cost about $500,000, including equipment.

The Kalamazoo Sanitary Mfg. Co., Factory and Acott streets, Kalamazoo, Mich., has rejected all bids for its two-story addition, 120 x 400 ft., and will call for new figures later. The extension with machinery is estimated to cost about $200,000. E. V. Brigham is manager.

Morris Zack, 510 Josephine Street, Detroit, has plans under way for a new one story machine shop on Holbrook Street, in connection with a garage, estimated to cost approximately $25,000. J. I. Weinberg, 401 Congress Building, is architect.

A vocational department will be installed in the two-story high school to be erected at Grosse Isle, Mich., 96 x 130 ft. Malcomson, Higginbotham & Palmer, 404 Moffat Building, Detroit, are architects.

The City Council, Bay City, Mich., will soon call for bids for a one-story power house and pumping plant for the waterworks system, estimated to cost about $85,000.

Indianapolis

INDIANAPOLIS, April 24.

A vocational department will be installed in the new two-story and basement high school at Lanesville, Ind., by the Franklin School Township Board, Georgetown, Ind. George C. Doolittle, Corydon, Ind., is architect.

A vocational department will be installed in the new high school to be erected at Newcastle, Ind., estimated to cost about $300,000.

Electric power equipment, motors, conveying equipment, etc., will be installed in the one-story plant to be erected by the Jasper Chair Co., Jasper, Ind., estimated to cost about $100,000, including machinery. H. Ziegler Dietz, 5 East Market Street, is architect.

The Board of Public Works, City Hall, Hammond, Ind., will take bids until May 1 for a power house, including equipment, in connection with extensions and improvements in the sewerage pumping system. W. F. Bridge is engineer.

A vocational department will be installed in the new high school to be erected at Garrett, Ind., estimated to cost about $85,000.

The Zeigler Mfg. Co., Alexandria, Ind., manufacturer of stamped metal products, is planning for the installation of new equipment, including presses, tappers, grinders, annealing furnaces and heat-treating apparatus.

Milwaukee

MILWAUKEE, April 24.

Activity in metal-working industries in this vicinity has made further substantial gains the past week. Orders are still confined mostly to single tool, with here and there a requirement of several machines for replacement or to piece out equipment. The tone of business this month is appreciably better than in March and sales are expected to run higher. Foundries are making good headway and for the first time in nearly two years the demand for molders is greater than the supply. Machine shops are adding men steadily but few as yet are operating in excess of 50 per cent of capacity. Manufacturers of automotive parts and specialties lead in the number of men being added to working forces. Motor truck factories are now participating in the revival of demand for power vehicles.

The Obenberger Forge Co., Milwaukee, a new $250,000 corporation organized to take over the plant and business of the defunct John Obenberger Forge Co., West Allis, has perfected its organization by the election of the following officers: President, Fred W. Smith; vice-president, Bert A. Stenz; secretary-treasurer, Lebrecht L. Klug; directors, W. F. Luedke, B. Hoffmann and William Eichhorn. Mr. Smith is president and Mr. Klug, secretary-treasurer of the Klug & Smith Co., 40 Mack Block, consulting and contracting engineers, and Mr. Stenz is president Stenz Electric Co. The directors represent members of a group of creditors who bid in the Obenberger property and are now resuming the operation. Beyond a few purchases of equipment for replacement and other immediate needs, the new owners will not at present be in the market for machinery.

The Tomahawk, Wis., Steel & Iron Works placed in operation on April 15 its new foundry and machine shop, erected at a cost of $75,000 to replace the group destroyed by fire last fall.

The Mound City Mfg. Co., Platteville, Wis., has been incorporated with a capital stock of $75,000 to manufacture manual and power lawn mowers, garden tools, etc. Provision is being made for production. The principals are James Dolan, R. I. Dugdale and Adam Miller, all of Platteville.

The K. O. Muehlberg Co., Manitowoc, Wis., incorporated recently with $60,000 capital to take over and develop the business of Karl O. Muehlberg, manufacturer of metal-working machinery and tools for automotive and repair shops, has purchased the plant of the Hoffman Glove Co., containing about 15,000 sq. ft., and will remodel it for immediate possession. Additional machinery is being purchased. Karl O. Muehlberg is president.

The Republic Box Co., Chicago, has definitely decided to build a new mill, box and crating factory at Marinette, Wis., to replace the one destroyed by fire several weeks ago, with a loss of $125,000. Details have not yet been arranged however. George Engelking, Chicago, is president.

The Milwaukee-Western Fuel Co., 1400 Wells Building, Milwaukee, is taking figures on conveyors, hoists, and other equipment for two new coal pockets costing $100,000 for car and truck loading at its Canal Street dock at Muskego Avenue. Contracts for the structures have been let. William F. Ardern is vice-president and general superintendent.

The Burnham Brothers Brick Co., 63 Wisconsin Street, Milwaukee, has plans for a new brick and tile plant estimated to cost $200,000 between South Milwaukee and Carrollville. George E. Burnham is president.

The Stout Mfg. Co., Milwaukee, has been organized with a capital stock of $150,000 by Lee H. Payne, 1376 Farwell Avenue, and Harry L. Neumeister, 699 Booth Street, to manufacture engines, machinery, crates, and other commodities. The principals are not ready to make detailed announcement of the enterprise.

J. J. Breister & Sons, Fond du Lac, Wis., manufacturers of brick and tile, have acquired the site of the former Fond du Lac Brick Co., and will erect new buildings, including power plant and boiler house, kilns, etc., as well as install new excavating, mixing, molding and conveying machinery. The investment will be about $65,000.

The Master Self-Locking Differential Co., Green Bay, Wis., established about three years ago and conducting operations in leased quarters, expects to relocate its plant and headquarters in Sheboygan, Wis., where local capital is becoming interested to the extent of $30,000. R. C. Moore

is conducting negotiations for the Green Bay concern.

G. W. Glover, Madison, Wis., has plans for a $20,000 garage and shop building to be erected at 737-739 West Washington Avenue.

The Kaukauna, Wis., Board of Education is taking sealed bids for new junior high and vocational training school estimated to cost $200,000 complete. The architects are Parkinson & Dockendorff, LaCrosse, Wis.

The Gulf States

BIRMINGHAM, April 24.

The Galveston, Harrisburg & San Antonio Railroad Co., Houston, Tex., is planning the erection of a new machine shop in the vicinity of El Paso, Tex., estimated to cost about $200,000, including equipment. C. R. Morrill is superintendent in charge.

The Brooks Supply Co., 799 Franklin Street, Beaumont, Tex., is planning the erection of an addition to its machine shops to manufacture oil well and other machinery.

The City Council, Clermont, Tex., has plans under consideration for a municipal electric light and power house.

The Louisiana Gravity Canal Co., Alexandria, La., is having plans prepared for five hydroelectric generating plants at Lake Charles, Washington, Jennings and in the vicinity of Alexandria, with total capacity approximating 125,000 hp. The project is estimated to cost in excess of $650,000. Welman Bradford is president.

The Brady Compress Co., Brady, Tex., is completing arrangements for the construction of a new cotton compressing plant to replace its works destroyed by fire a few months ago. It will cost in excess of $40,000, including machinery.

Vocational shops will be constructed at the new high school at Mexia, Tex., bids for which are being asked. It will be two stories, 156 x 165 ft., and is estimated to cost $190,000. DeWitf & Lemmon, Dallas, Tex., are architects.

J. L. Bailey, Temple, Tex., is planning for enlargements and improvements in his electric power house at Killeen, Tex., to include the installation of considerable new machinery.

The Common Council, Fernandina, Fla., is arranging for a bond issue of $150,000 for extensions and improvements in the municipal electric power and ice-manufacturing plant.

The Southern Woven Lath Co., P. O. Box 1627, Birmingham, recently organized, has preliminary plans under way for the erection of a series of plants to manufacture wire and wood lath. A local plant will be operated with a capacity of about 100,000 sq. ft. of material per day. George W. Randall is president and D. C. Sharp, general manager.

The Standard Oil Co., Haynesville, La., will build a new local storage and distributing plant, to comprise 70 55,000-bbl. steel tanks, pumping equipment, etc.

The Texas Electric Railway, Dallas, Tex., is disposing of a bond issue of $625,000, the proceeds to be used in part for extensions and improvements in power plants, lines and system.

The Common Council, Melville, La., has plans under way for remodeling the municipal electric power plant and the installation of new machinery, estimated to cost in excess of $35,000. The Swanson-McGraw Co., 705 United Fruit Building, New Orleans, is engineer.

A vocational department will be installed in the new high school to be erected at West Palm Beach, Fla., by the County Board of Public Instruction, estimated to cost about $150,000.

The Texas Power & Light Co., Dallas, Tex., has preliminary plans under way for a new central generating plant in connection with the proposed acquisition of the municipal electric plant at Austin and the furnishing of service in this section. The Austin plant will also be improved and enlarged. The work is estimated to cost in excess of $400,000.

Fire, April 17, destroyed a portion of the automobile repair works of the Hogue Mfg. Co., Paris, Tex., with loss estimated at $40,000, including equipment. It is expected to rebuild at an early date. W. E. Hogue is head.

The Armour Fertilizer Works, 209 West Jackson Boulevard, Chicago, is considering tentative plans for the rebuilding of the portion of its plant at Shrewsbury, La., destroyed by fire April 21, with loss estimated at $250,000, including machinery.

The N. O. Nelson Mfg. Co., Tenth and Chestnut streets, St. Louis, manufacturer of pipe, plumbing fixtures, etc., has awarded contract to the Munn Construction Co., Dallas, Tex., for a two-story plant at McKinney Avenue and Broom Street, Dallas, totaling about 41,000 sq. ft., estimated to cost $115,000. Contract has also been let to Donald Hall, Houston, for a three-story branch plant at the latter location, 60 x 125 ft., with one-story building adjoining, estimated to cost about $75,000.

Fire, April 13, destroyed a portion of the plant of the E. H. Keller Auto Works, Fort Worth, Tex., with loss estimated at about $125,000, of which approximately $50,000 represents the machinery loss. E. H. Keller is head.

The Yorktown Electric & Ice Co., Yorktown, Tex., is considering plans for the rebuilding of its plant, destroyed by fire April 15, with loss estimated at $50,000.

The Central South

ST. LOUIS, April 24.

The Oil Well Improvement Co., Collinsville, Okla., manufacturer of oil well machinery and parts, is planning for a one-story addition. Ray Peters is superintendent.

The Ozark Power & Water Co., Joplin, Mo., has arranged for a bond issue of $2,000,000, the proceeds to be used in part for extensions and improvements in power plans and system. The company is operated by the Cities Service Co., 60 Wall Street, New York.

The Ashland Fire Brick Co., Ashland, Ky., will build a one-story addition, 135 x 192 ft., in connection with other extensions and improvements. Additional machinery will be installed to develop a capacity of about 50,000 brick per day. E. H. Gartrell is general manager.

The International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded a contract to L. W. Hancock, Louisville Trust Building, for a four-story and basement distributing plant at Fourteenth and Walnut streets, 100 x 160 ft., with machine works and service department. It will cost about $150,000.

The Strawboard Mfg. Co., Jefferson City, Mo., has plans under way for the erection of a new two-story factory, 60 x 150 ft., for the manufacture of composition board products, estimated to cost close to $40,000.

The Missouri, Kansas & Texas Railroad Co., St. Louis, is considering tentative plans for the electrification of its lines from Oklahoma City to Atoka, Okla., a distance of about 100 miles.

A vocational department will be installed in the three-story high school to be erected at Liberal, Kan., estimated to cost about $175,000. Lorentz Schmidt & Co., 121 North Market Street, Wichita, Kan., are architects, and will call for bids early in May.

The Muskogee Refining Co., South Cherokee Street, Muskogee, Okla., is planning for the installation of new electric power and other equipment at its oil refinery.

The City Council, Nashville, Tenn., has appropriated $90,000 for rebuilding its municipal electric power plant on First Avenue. J. O. Tankard is commissioner of lights and lighting, in charge.

Jacob Levy, 712 West Main Street, Louisville, has awarded contract to Albert Bernstein, 2019 Napoleon Boulevard, for a one-story garage at 949 West Third Street, with machine and repair departments, estimated to cost about $45,000.

The Vaughn & Son Boiler & Machine Co., Grand Avenue, Joplin, Mo., has acquired the plant and business of Robbins & Long, manufacturers of kindred products. It will be removed to the Grand Avenue works and manufacture concentrated at this location.

The Bathman-Winger Radio Co., 14 East Eighth Street, Chattanooga, Tenn., recently organized, is planning the establishment of a factory to manufacture wireless equipment. Earl W. Winger is president and Wallace Bathman, secretary and treasurer.

Electric cranes, conveying machinery and other equipment will be installed in the new plant to be built by the Schutte Lumber Co., Grand Avenue and McGee Street, Kansas City, Mo., estimated to cost about $100,000, including equipment.

M. McFernan, 4133 Independent Avenue, Kansas City, Mo., has plans under way for a four-story automobile service building, 75 x 270 ft., to include a machine and repair department.

Electrically operated pumping plants for high and low pressure filtration machinery and other electrical and mechanical equipment will be installed by the Water Commission, Orear-Leslie Building, Kansas City, Mo., in connection with plant extensions and improvements. Bonds for $11,000,000 were approved at a recent special election, and a portion of this fund will be used for immediate work. Fuller & McClintock, 419 Produce Exchange Building, Kansas City, are consulting engineers.

The Southern Oil Marketing Co., Nashville, Tenn., has taken over the plant and business of Colyar, Reese & Co., Memphis, Tenn., and contemplates the erection of additions to the distributing plant to cost about $100,000, including equipment.

The St. Louis & San Francisco Railroad Co., St. Louis, is arranging an appropriation of $204,350, the proceeds to be used for extensions in electric power plants and for machinery and tools.

The L. Singer Produce Co., 5 City Market, Kansas City, Mo., has plans for a new cold storage and refrigerating plant, 80 x 100 ft. The Tait & Nordmeyer Engineering Co., International Life Building, St. Louis, is engineer.

The Universal Motor Car Co., Memphis, Tenn., is planning the erection of a new two-story service building at 234 Jefferson Street, 100 x 150 ft., to include a machine and repair shop, estimated to cost $50,000. James M. Walker is president and treasurer.

Canada

TORONTO, April 24.

The improved conditions which made their appearance in this market the past few weeks continue to hold, and with but few exceptions dealers report having closed some fairly good orders for equipment the past week. While large-sized lists are still absent, there is a steady demand for two or three machines to a customer, with the result that dealers and makers are closing a very good volume of business. Industrial activities generally are making progress and a considerable number of manufacturers are increasing production, which in many cases has made buying a necessity. The recent reduction in prices on some lines of tools has had a stimulating effect on the market in these particular commodities. While no further reductions have been announced, it is the general opinion that further price cutting will shortly go into effect. Dealers are shading prices to secure some of the larger orders that are making their appearance. Inquiries continue numerous and it is expected that many will shortly turn into actual sales, as users appear to have passed the stage where they are sending out feelers with regard to the market. The demand for small tools continues in steady volume.

Bids are being received by John L. Wilson, clerk, Seaforth, Ont., for one motor-driven fire pump, one gasoline-driven fire pump and two deep well pumps.

John McHattie, secretary of the Water Commission, Petrolia, Ont., is receiving bids for one 800-gal-per-min. motor-driven centrifugal pump.

The Myers Lumber Co., 15 Toronto Street, Toronto, is building a lumber mill.

The Diamond Crystal Salt Co., St. Clair, Mich., will build a refining plant at Courtright, Ont., to cost $50,000.

Construction has started on additions to the plants of Fisher Motor Co. and the Canada Electric Castings Co., Orillia, Ont.

The Avion Power Co. has received instructions to proceed with a power development program at Avion Falls, Ont.

Wettlaufer Brothers, Ltd., 178 Spadina Avenue, Toronto, has started work on a new foundry at Mitchell, Ont., which will give 12,000 ft. of additional floor space to the present plant. New machinery will be installed, but a list has not yet been made.

The Manitoba Power Co., Ltd., Winnipeg, Man., has plans under way for a new hydroelectric power plant on the Winnipeg River, near Great Falls, Man., to comprise six units, estimated to cost close to $10,000,000, including machinery, transmission lines, etc.

The Pacific Coast

SAN FRANCISCO, April 18.

The Regan Forge & Engineering Co., Regan Street, San Pedro, has filed plans for a new forge and machine shop, 80 x 200 ft., estimated to cost in excess of $30,000, including equipment.

The San Rafael Ice Co., San Rafael, Cal., is arranging for the erection of a new ice-manufacturing plant, 50 x 100 ft., to cost about $50,000. E. P. Grady is president.

The Universal Products Co., Thayer Building, Oakland, Cal., manufacturer of metal specialties, has preliminary plans under way for a new factory to cost about $90,000, including machinery.

The Southern California Ice Co., San Bernardino, Cal., is contemplating the erection of a new ice-manufacturing and cold storage plant at Third and I Streets, to consist of three units. One unit will be constructed at the present time.

The Durant Motors Co., Oakland, Cal., is receiving estimates for the completion of a new two-story, reinforced-concrete plant at East Fourteenth Street and Stanley Avenue, to cost in excess of $75,000. H. J. Brunnier, Sharon Building, San Francisco, is engineer.

The Fullerton Union High School District, Fullerton, Cal., is having plans prepared for a two-story power house, 50 x 75 ft., and one-story addition to the manual arts building, 45 x 130 ft. Carleton M. Winslow, 1134 Van Nuys Building, Los Angeles, is architect.

The Board of Directors, Pear Growers' Association, Palmdale, near Burbank, Cal., has authorized the preparation of plans for a local ice-manufacturing and refrigerating plant to cost about $225,000, including machinery.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has plans under way for a new power house at Yuba City, Cal., to cost about $75,000. It is also planning for extensions and improvements in its transmission system in the Martinez district to cost about $250,000, including equipment.

The Union Ice Co., 354 Pine Street, San Francisco, is contemplating the construction of a new four-story, reinforced-concrete ice-manufacturing plant at Napa, Cal., estimated to cost about $500,000, including machinery.

The Washington Auto Body & Wheel Mfg. Co., Seattle, Wash., recently organized to manufacture automobile wheels and bodies, has taken over property at 911-15 Eleventh Avenue for its proposed plant. Louis Williams heads the company; Gustave Eicks is general manager.

The Oregon-Kalama Lumber Co., Kalama, Wash., recently organized with a capital of $500,000, has plans under way for a new sawmill with initial capacity of 100,000 ft. a day. It will be electrically operated. The company is headed by W. D. Moreland and W. D. Vaness.

The Elko-Lamoille Power Co., Elko, Nev., has plans under way for the erection of a new power house to cost about $50,000.

The Wenatchee Woodworking Co., Wenatchee, Wash., has acquired property, 120 x 150 ft., and plans for the immediate erection of a new factory to cost about $30,000. S. A. Ewing is head.

The Western States Gas & Electric Co., Stockton, Cal., is perfecting plans for a new hydroelectric generating plant on the American River, near Placerville, Cal., to cost more than $500,000.

The Enterprise Electric Co., Enterprise, Ore., has plans under way for a hydroelectric power plant on the Wallowa River, with transmission and distributing system estimated to cost $100,000.

The Virginia & Truckee Railway Co., Carson, Nev., is arranging to electrify its local shops, replacing present steam-operating equipment. Motors, controllers and other industrial electric apparatus will be installed. Frank Murphy is vice-president.

Plans of New Companies

The Greenduck Metal Stamping Co., 2127 Tilden Ave., Chicago, recently incorporated with a capital of $100,000 to manufacture stamped metal specialties, has a fully equipped plant and will do its own manufacturing.

The Seamless Container Co., Hartford, Conn., manufacturer of paper containers, recently incorporated, has rented a building and the machinery is installed.

Johnston Brothers, Inc., Ferrysburg, Mich., succeeds the partnership of Johnston Brothers, without any other change.

The Diamond Power Specialty Corporation, Detroit, does not expect to do any building, as it has purchased the buildings formerly occupied by the Diamond Power Specialty Co. and the Calorizing Corporation of America.

The Titman Carburetor & Motor Devices Co., Inc., Rahway, N. J., expects to manufacture its own products when organization plans are completed. It may have some small jobs done by contract in the meantime. The company will engage in the manufacture and retail distribution of the Titman super heating carburetor, beginning in the early summer.

The Sleeper Radio Corporation was organized to take over the General Apparatus Co., Inc., 38 Park Place, New York, which has been in the wireless business for the last four years. The reason for the change was to have a name more closely identified with the business the company is doing, and also to capitalize the good-will built up by Milton B. Sleeper through his numerous books on wireless. The Sleeper Radio Corporation will continue the policies of the General Apparatus Co. in manufacturing and marketing standardized wireless parts and units. It also publishes a technical shop publication which tells the amateur how to build his own radio apparatus of standardized parts.

The Simmons Machine Co., Albany, N. Y., will open a machine tool warehouse May 1 at No. 182 Lafayette Street, New York. All machines displayed in this warehouse will be tools rebuilt at the Albany plant.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined iron bars, base price	2.48c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.48c.
Hoops, base price	3.38c.
Bands, base price	2.98c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.58c.
Channels, angles and tees under 3 in. x ¼ in., base	2.48c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.40c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.60c.
Toe-calk, ½ x ⅜ in. and larger	3.20c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.50c. to 6c.
Shafting and Screw Stock:	
Rounds	3.35c.
Squares, flats and hex	3.85c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.58c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.38c. to 3.53c.
No. 12	3.43c. to 3.58c.
No. 14	3.48c. to 3.63c.
No. 16	3.53c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.25c.
No. 26	3.90c. to 4.15c.	4.30c.
No. 28	4.00c. to 4.25c.	4.40c.
No. 30	4.25c. to 4.50c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.10c. to 4.35c.
No. 16	4.25c. to 4.50c.
Nos. 18 and 20	4.40c. to 4.65c.
Nos. 22 and 24	4.55c. to 4.80c.
No. 26	4.70c. to 4.95c.
No. 27	4.85c. to 5.10c.
No. 28	5.00c. to 5.25c.
No. 30	5.50c. to 5.75c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.
½ in. Butt	—56	—40
¾ in. Butt	—61	—47
1-3 in. Butt	—63	—49
3½-6 in. Lap	—60	—46
7-8 in. Lap	—56	—34
9-12 in. Lap	—55	—33

Wrought Iron	Black	Galv.
¾ in. Butt	—30	—13
1½ in. Butt	—32	—15
2 in. Lap	—27	—10
2½-6 in. Lap	—30	—15
7-12 in. Lap	—23	— 7

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	16½c. to 16¾c.
High brass wire	16¾c. to 17 c.
Brass rod	14 c. to 14¼c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	18½c. to 19 c.
Copper tube, seamless	20¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19½c. to 20½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20	
			Primes Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.05 $5.80
		90 lb.	6.15 5.90
		100 lb.	6.25 6.00
IC	$10.00 $8.50	IC	6.40 6.15
IX	11.50 10.00	IX	7.40 7.15
IXX	13.00 11.25	IXX	8.40 8.15
IXXX	14.25 12.50	IXXX	9.40 9.15
IXXXX	16.00 14.00	IXXXX	10.40 10.15

Terne Plates

8-lb. coating 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	33½c.
Bar	40c. to 44c.

Copper

Lake ingot	15 c.
Electrolytic	14¾c.
Casting	14½c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	9c. open 9½c.

Lead and Solder*

American pig lead	6½c. to 6¾c.
Bar lead	7 c. to 7¼c.
Solder, ½ and ½ guaranteed	23c.
No. 1 solder	21½c.
Refined solder	18c

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	6¼c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	25c. to 27c.

Old Metals

The market continues firm with an upward tendency. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	10.75
Copper, heavy wire	10.00
Copper, light and bottoms	8.25
Brass, heavy	5.25
Brass, light	4.50
Heavy machine composition	7.75
No. 1 yellow brass turnings	5.25
No. 1 red brass or composition turnings	6.75
Lead, heavy	4.00
Lead, tea	2.75
Zinc	2.50